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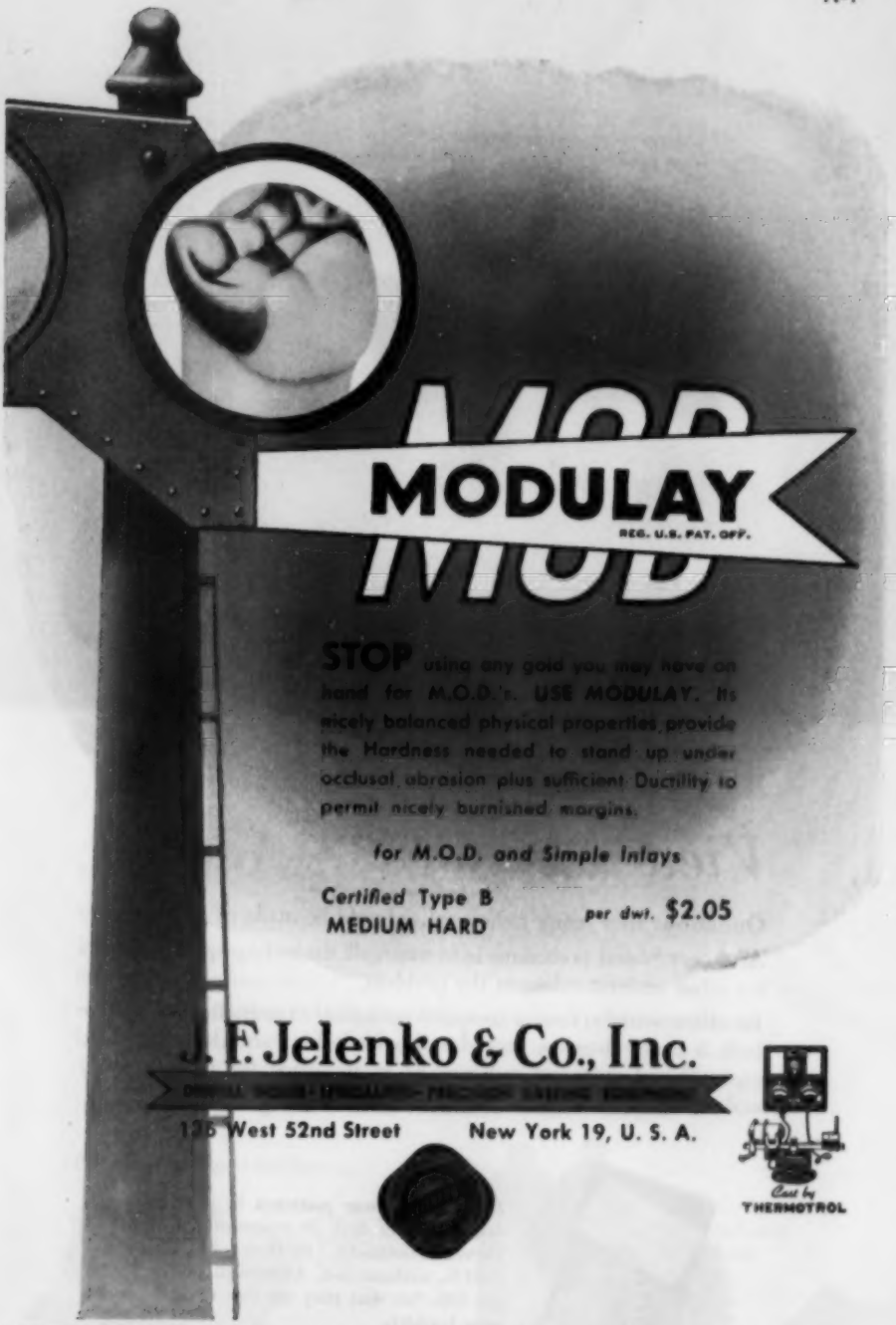
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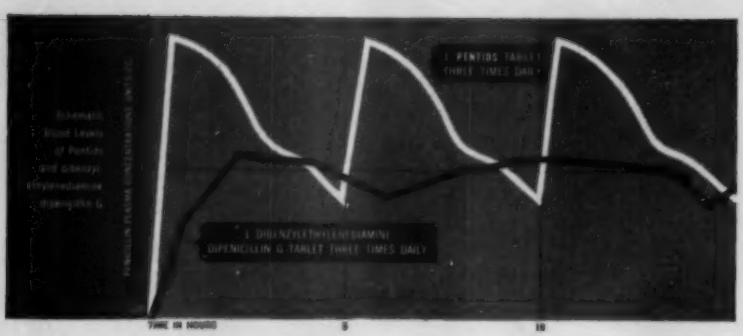

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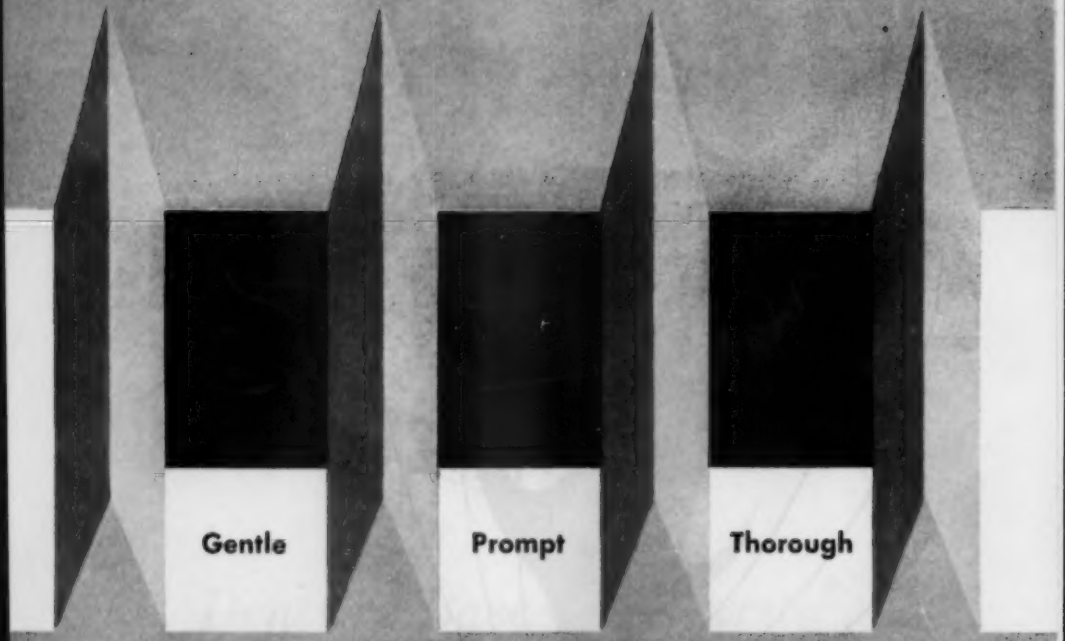

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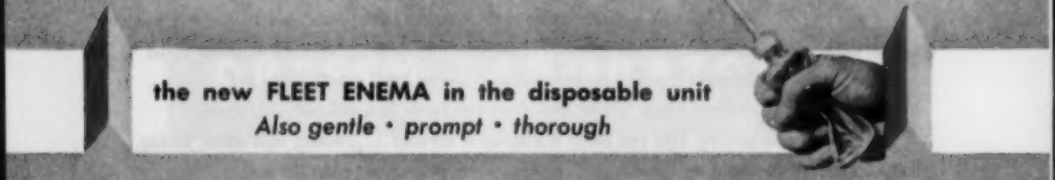

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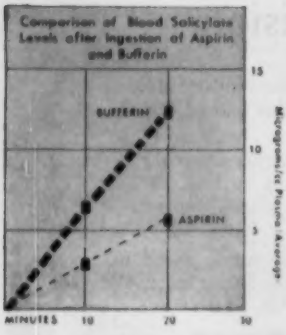

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The peripheral giant cell reparative granuloma

Joseph L. Bernier, D.D.S., M.S., and Lester R. Cahn,† D.D.S., Washington, D. C.*

The large number of case records in the files of the Armed Forces Institute of Pathology has made it possible to undertake a review of a significant group of lesions commonly referred to as giant cell epulides, with the view to establishing their true nature.

In the past these lesions often have been considered as similar to the true giant cell tumor; however, because of their natural history, recent writers have emphasized their lack of similarity. Jaffe[1] has suggested the term "giant cell reparative granuloma of the jaw bones" for the intraosseous lesion which he believes to be different from the true giant cell tumor; a point with which the present authors agree. This study has indicated many points of similarity between the lesions in this study and the "giant cell reparative granuloma" of Jaffe. Most important is the obvious relation of both to trauma. Adoption of Jaffe's term, with the qualification "peripheral" therefore seemed logical.

The first to recognize the giant cell tumor as an entity was Sir Astley Cooper[2] who believed it to be benign (1818). Lebert[3] in 1845 also emphasized its benign character. Paget[4] in 1853 presented an accurate description of this condition which has not been materially improved

*Chief, oral pathology branch, Armed Forces Institute of Pathology.

†Assistant professor of oral pathology, Columbia University; resident consultant, Armed Forces Institute of Pathology.

1. Jaffe, H. L. Giant cell reparative granuloma, traumatic bone cyst, and fibrous (fibro-osseus) dysplasia of the jawbones. Oral Surg., Oral Med. & Oral Path. 6:159 Jan. 1953.

2. Cooper, Sir Astley, and Travers, Benjamin. Surgical essays, vol. 1. London, Cox & Son and Longman & Co., 1818, p. 195.

3. Lebert, Hermann. Physiologie pathologique, ou recherche cliniques, expérimentales et microscopiques sur l'inflammation, la tuberculisation, les tumeurs, la formation du cal, etc., vol. 2. Paris, J. B. Ballière, 1845, p. 120.

4. Paget, Sir James. Lectures on surgical pathology, delivered at the Royal College of Surgeons of England, vol. 2. London, Longmans, 1863, p. 371, 372.

upon to date. He also considered it to be benign and suggested the term "myeloid tumor" believing that it arose in the marrow substance. Nelaton,[5] in a lengthy monograph (1860), fully described the clinical, gross and microscopic features and stressed the point that the "tumor" was only locally malignant. In 1862 Virchow[6] suggested that the "tumor" might be malignant, and referred to the possibility of "degeneration into cancer." Gross[7] (1870) analyzed 70 cases and considered the "tumor" benign, although he admitted that there was difficulty in distinguishing it from the aneurysmal type of malignant medullary sarcoma.

Because of its tendency to recur locally if incompletely removed and because of the authority of Virchow's opinion, most surgeons considered the giant cell "tumor," or as it was often called, "giant cell sarcoma," as malignant. This resulted in many unnecessary amputations. In 1910 Bloodgood[8] once more emphasized the benign character of the lesion, and recommended the term "giant cell tumor." In 1919 he[9] reported on 47 central tumors that had been treated simply by thorough curettage without recurrence. Since that time it has been generally accepted as a benign tumor for which conservative treatment is indicated. It is obvious that some of these writers were referring to the true central giant cell tumor of bone and others to the giant cell reparative granuloma which were not then generally recognized as separate entities. It is also now apparent that the giant cell reparative granuloma may be both peripheral as well as intraosseus, and that the former is most common in the oral regions.

ORIGIN OF GIANT CELLS

The origin of the giant cells has not been settled, and this continues to be an important point in the establishment of the pathogenesis of both the giant cell reparative granuloma and giant cell tumor, even though these giant cells probably are of lesser importance than the stromal tissue. As has been stated, most of the earlier writers believed that the giant cell tumor originated in the hematopoietic element of the bone marrow, and that the giant cells were modified megakaryocytes. For this reason the term "myeloid tumor" or "myeloid sarcoma," as suggested by Paget, was commonly used. Some of the earlier investigators such as Virchow[6] and Rindfleisch[10] believed that the giant cells were hypertrophied bone cells. This conception is not noticeably different from the present references to the stem cell origin of the osteoblast and the osteoclast. In 1922 Stewart[11] concluded that the giant cells were osteoclasts and suggested the term "osteoclastoma" for the true giant cell tumor. This term has persisted to date in the English writings for both the giant cell tumor and the giant cell reparative granuloma. He based his reasoning on the fact that these giant cell tumors, and he was speaking of those not associated with the jaws, appear only in bone formed in cartilage, and that they arise from those osteoclasts which, at an earlier period, absorbed the primitive ossified cartilage of the epiphyseal line in the process of growth. Further, he believed that when a hyperplasia of these osteoclasts took place the osteoclastoma

5. Nelaton, Eugene. Mémoire sur une nouvelle espèce de tumeurs à myéloplaxes. Paris, Adrien Delahaye, 1860.

6. Virchow, Rudolf. Die krankhaften Geshwülste. Berlin, A. Hirschwald, 1864-1865.

7. Gross, S. W. Sarcoma of the long bones; based upon a study of one hundred and sixty-five cases. Am. J. Med. Sc. 78:17 July 1879.

8. Bloodgood, J. C. Benign bone cysts, ostitis fibrosa giant cell sarcoma and bone aneurism of the long pipe bones. Ann. Surg. 52:145 Aug. 1910.

9. Bloodgood, J. C. Bone tumors. Central (medullary) giant cell tumor (sarcoma) of the lower end of ulna. Ann. Surg. 69:345 April 1919.

10. Ewing, J. Neoplastic diseases, ed. 4. Philadelphia, W. B. Saunders Co., 1940, p. 321.

11. Stewart, M. J. Histogenesis of myeloid sarcoma. Lancet 2:1106 Nov. 25, 1922.

occurred. Geschickter and Copeland[12] followed this same line of reasoning in accounting for both the central giant cell tumor and the peripheral giant cell reparative granuloma which they did not clearly separate.

Although the squamous portion of the temporal bone, the superior maxilla and a large portion of the mandible are formed from membrane, there are also cartilaginous centers of ossification in the neighborhood of the temporal fossa, the maxilla and the mandible. These areas are common loci for the central giant cell reparative granuloma as well as the giant cell tumor. Geschickter and Copeland[12] believe that age limits and the failure of the peripheral giant cell reparative granuloma to occur about the molar teeth indicated a relationship to the deciduous teeth which in the process of shedding are associated with an abundance of odontoclasts (osteoclasts), and that hyperplasia of these odontoclasts might result in a peripheral osteoclastoma (peripheral giant cell reparative granuloma). Stones[13] agrees with this conception, but is compelled to rationalize when explaining the peripheral giant cell reparative granuloma seen in the molar region of the older patient. He states that in these lesions the resting, undifferentiated mesenchymal cell is the source of the giant cell.

There have always been certain writers who did not believe in either the osteoclastic or the myeloid origin of the giant cell. For example, Malassez[10] concluded that the giant cells of the so-called "epulis" were derived from modified endothelium. Later Mallory[14] held that they were transformed wandering endothelial leukocytes and that they were not a part of the tumor process. Siegmund and Weber,[15] among the German writers, thought that the giant cells originated in the capillary endothelium. Ewing[16] expressed no definite opinion on this point; however, he gave considerable attention to this as a possibility.

Table 1 • Location of 43 peripheral giant cell reparative granulomas in 41 patients*

Location	Distribution of lesions					
	Number			Per cent		
	Total	Right	Left	Total	Right	Left
Maxilla	21	14	7	49.	54.	41.
Mandible	22	12	10	51.	46.	59.
Total	43	26	17	100.	100.	100.

*One patient had lesions in both right and left maxilla; another, in both right and left sides of the mandible.

CLINICAL ANALYSIS

Forty-one peripheral giant cell reparative granulomas were studied and the following data were obtained.

Location • Twenty-one (48.8 per cent) occurred in the maxilla and 22 (51.2 per cent) in the mandible (Table 1). This distribution is in agreement with other published reports. In contrast, the intraosseus giant cell reparative granuloma, however, occurs with much greater frequency in the mandible. In two of the cases the lesions were bilateral; in each instance one occurred in the maxilla and one in the mandible. In view of the theory of Geschickter and Copeland regarding the influence of the shedding of deciduous teeth in the etiology of these lesions, it is interesting to note that 12 of the 41 lesions in this series occurred in the molar regions and that the average age of these 12 patients was 28 years. This, together with the fact that only one of the patients was under 20 years of age would tend to discount their theory. Five of the 41 lesions occurred

12. Geschickter, C. F., and Copeland, M. M. Tumors of bone. Internat. S. Digest 10:323 Dec. 1930.

13. Stones, H. H. Oral and dental diseases. Baltimore, Williams & Wilkins Co., 1948.

14. Mallory, F. B. Giant cell sarcoma. J. Med. Research 19:463, 1911.

15. Siegmund, H. F. K., and Weber, R. Pathologische Histologie der Mundhohle. Leipzig, S. Hirzel, 1926.

16. Ewing, J. Neoplastic diseases, ed. 4. Philadelphia, W. B. Saunders Co., 1940.

in edentulous mouths and three of these were in molar regions. A number of authors have implied that teeth must be present in order for the peripheral giant cell reparative granuloma to occur; however, this is a mistaken suggestion since, although the periodontal membrane ceases to exist *per se* after the extraction of the tooth, cells with the potential for both osteogenesis and cementogenesis remain.

Age Distribution • The average age for all cases was 32.1 years; the average age of men and women was approximately the same. These data are based on the recorded age of the patient at the time of the first examination. The intraosseus lesion, according to Jaffe, occurs at a somewhat earlier age.

Trauma • There were 19 cases (46.3 per cent) in which no information as to trauma was available. In the remaining 22 (53.7 per cent) such a history was present, the traumatogenic influence being chiefly the extraction of teeth. Such factors as periodontal treatment, chronic infection, irritation from prosthesis, nondental trauma due to accidents and the

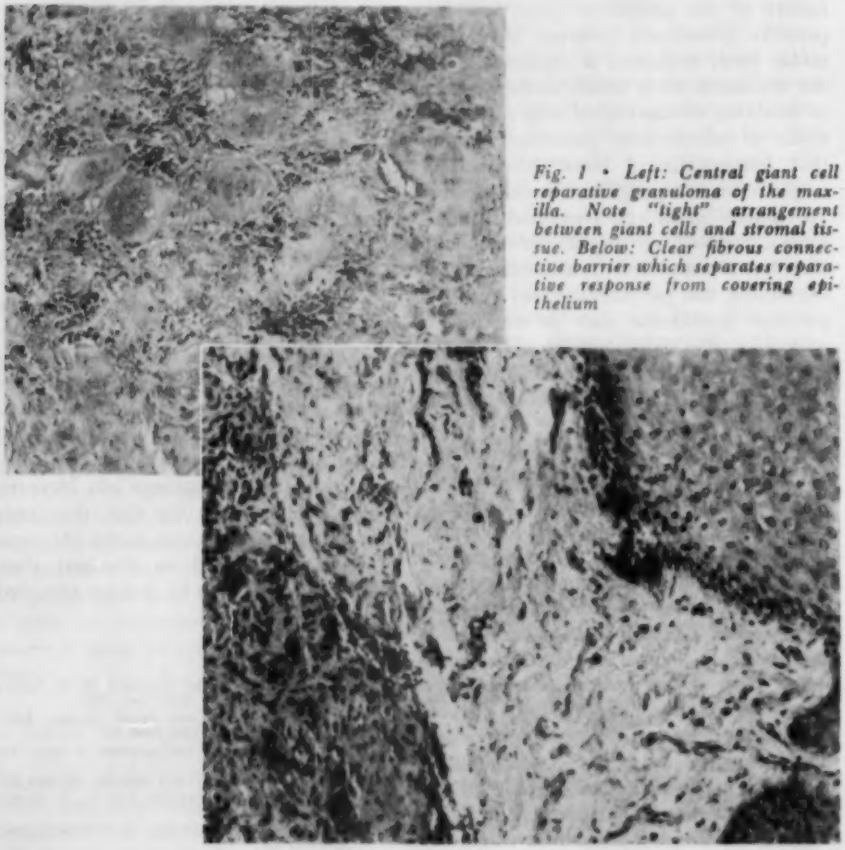

Fig. 1 • Left: Central giant cell reparative granuloma of the maxilla. Note "tight" arrangement between giant cells and stromal tissue. Below: Clear fibrous connective barrier which separates reparative response from covering epithelium

injudicious use of toothpicks were all mentioned, however. The presence of trauma in every case in which there was an available history suggests that this factor must be considered as important etiologically.

HISTOLOGY

The term "peripheral giant cell reparative granuloma" is suggested to designate what the authors believe to be the parosteal counterpart of the "central giant cell reparative granuloma" that occurs intraosseously and usually is associated with trauma (Fig. 1, left). This term applies only to the oral lesions. The peripheral giant cell reparative granuloma as well as the central giant cell reparative granuloma must be separated clearly from the true central giant cell tumor of bone which is a neoplasm that is capable, on occasion, of metastasis. The true central giant cell tumor of bone may have a peripheral (parosteal) counterpart in long bones, but has not been observed arising from the region of the periodontal membrane.

Giant Cells • There is no evidence to indicate that the giant cells are produced to remove bone even though they bear a morphologic similarity to osteoclasts. Therefore the term "osteoclastoma" seems inappropriate. The giant cells apparently arise from undifferentiated mesenchymal cells, and they are formed as part of a proliferating reparative response to local trauma. Under such circumstances they are not destined to remove bone and therefore do not completely qualify under the term "osteoclast" which denotes a specific capability.

Too much emphasis has been placed on the giant cells which are of lesser importance than the stromal cells. It is in the character of this latter tissue that neoplastic qualities are recognizable when they occur, and hence such lesions can be separated from the reparative reactions.

Table 2 • Summary of histologic data

Histologic data	Number			Per cent*
	Present	Absent	Not determined	Present
Connective tissue cell zone	34	3	4	92.
Hemorrhage	34	6	1	85.
Phagocytosis	36	2	3	95.
Calcified material	20	18	3	53.

*Per cent based on those with determined pathologic condition.

Connective Tissue Zone • Of interest is the almost uniform presence of a connective tissue zone (Table 2 and Fig. 1, below) which separates the reparative reaction from the covering epithelium. Apparently in the early stages the reparative reaction is rapid and fulminant, causing a compression of the surrounding fibrous connective tissue with the formation of a pseudocapsule. This can be likened to the "vascular sponge" effect described so well by Codman.[17] As the lesion matures, the fibrous connective tissue zone, which was first compressed, may with increased scarring in turn compress the reparative reaction, resulting in the eventual disappearance of the reparative reaction. Another interesting point is that the covering epithelium shows a minimal hyperplastic response to the underlying process.

Hemorrhage • The presence of red blood cells or pigment or both was interpreted in this study to be an indication of past hemorrhage. Thirty-four of the 40 cases (85 per cent) demonstrated the presence of one or both components (Table 2 and Fig. 2, left). In the re-

17. Codman, E. A. Treatment of giant cell tumors about knee. A study of 153 cases collected by registry of bone sarcoma of American College of Surgeons. Surg. Gynec. & Obst. 64:485 Feb. (no. 2A) 1937.

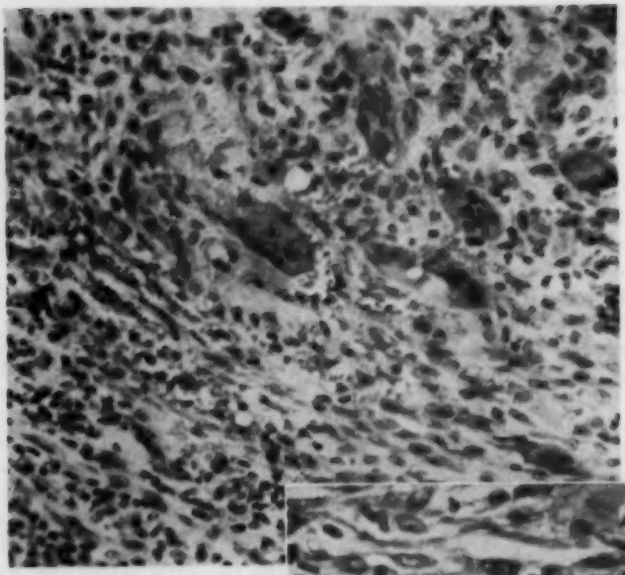

Fig. 2 • Left: Red blood cells scattered throughout stroma and active fibroblasts and macrophages in evidence

Right: Giant cells containing red blood cells and blood pigment

maining 6 (15 per cent) the process was undoubtedly well beyond the initial hemorrhagic stage. The early hemorrhagic phenomenon should not be confused with that which may occur as a result of superficial ulceration and which does not call forth the giant cells and is usually confined to the bordering connective tissue zone. It is not uncommon for macrophages in this outer layer of inflammatory tissue to become active; however, this is a secondary reaction.

Phagocytosis • Phagocytosis was evident in 36 (94.7 per cent) of the cases (Table 2 and Fig. 2, right). In three instances its presence or absence could not be determined. The material ingested by the phagocytes was chiefly blood pigment and red blood cells. As the reaction ma-

tures and the fibrous tissue matrix dominates the process, phagocytosis decreases.

Calcification • In over half of the cases in this series (52.6 per cent), the presence of spicules of calcified material was noted (Table 2) in the peripheral connective tissue zone, and in all instances the spicules resembled bone (Fig. 3, above). It would seem, however, that cementum or nonspecific calcified material might just as well have been produced.

These spicules of bone showed the presence of a wide osteoid zone (Fig. 3,

Fig. 3 • Above: Spicules of bone in surrounding connective zone indicating wide band of osteoid. Below: Reparative reaction

above) which may be related to local metabolic disturbances.

DISCUSSION

There have been two principal theories as to the origin of the giant cell reparative granuloma: (1) the neoplastic theory; (2) the traumatic theory. The validity of the latter theory has been supported by the present investigation, and it also seems to account for certain giant cell lesions found elsewhere in the skeleton.

The reaction, probably beginning as the result of an irritant, is perhaps best described as a reparative process which may remain static at any point in its evolution. It would appear that initially, hemorrhage occurs which is followed by a fibroendothelial response associated with an increase in the number and size of the blood vessels. With the hemorrhage there is an excessive production of the giant cells and a progressive enlargement of the lesion (Fig. 3, below). The giant cells may become phagocytic to the products of both recent and old hemorrhage, but only rarely act as osteoclasts. At any stage of development the giant cell reparative granuloma may proceed to a stage of resolution with the appearance of bone, cementum or foci of calcification.

It appears that the peripheral giant cell reparative granuloma is self-limiting even if left untreated. This feature is in contrast to the true giant cell tumor which may attain large proportions and rarely, if ever, demonstrates appreciable regression.

CONCLUSIONS

1. The term "peripheral giant cell tumor" is misleading since it suggests neoplastic qualities. The term "peripheral giant cell reparative granuloma" is therefore preferable.

2. The "peripheral giant cell reparative granuloma" is attributable to some form of trauma.

3. The lesion begins with hemorrhage which is followed by fibroendothelial proliferation.

4. The fibroendothelial reaction may become walled off by a connective tissue barrier.

5. It may, with maturity, become a fibrosed nodule.

6. Inasmuch as the lesion occurs in the region of a tissue with both osteogenic and cementogenic potentialities, the periodontal membrane, spicules of bone, cementum or amorphous calcification may be found.

7. The lesion is self-limiting and should be treated conservatively.

A Real Service • Our chief want in life is someone who shall make us do what we can. This is the service of a friend. ***Ralph Waldo Emerson.***

Dangers of scattered radiation in dental practice

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The roentgen ray is an indispensable diagnostic aid that dentists are using more and more as time goes on. With this increased use, however, the hazards to the operator are increasing because of exposure to radiation through lack of protection.

The medical roentgenologist has made strides in the investigation of radiation and the protection of the patient and operator. It behooves dentists to understand ways and means of protecting themselves. The possibility of overexposure is just as serious in the dental office because of the use of the roentgen ray, employing mass exposures and long exposure times.

Fortunately, equipment manufacturers have developed a machine that is relatively safe and does not cause shock. Radiation is emitted in one direction: through the cone. The x-ray tube is enclosed in a thick lead-shielded glass and leather and rubber cap.[1] The rays emitted through the cone are the primary rays and they are directed at the patient's face. Approximately 1 per cent penetrates the lead backing and the face.[2] The primary radiation forms a cone of dispersion as it leaves the target. At a target-film distance of 8 inches, the diameter of this cone is approximately 4⅛ inches at the film. It is obviously impossible for the operator to expose himself to primary radiation unless he holds the film in the patient's mouth or stands within the cone of dispersion. Obviously then, the problem is not primary radiation. There have been many instances of dermatitis and carcinogenic effects reported in the dental profession, however, which are caused by primary radiation, but these instances are on the decline.

The hazard in roentgenography is the scattered radiation which originates from the patient. (For purposes of expediency, scattered, secondary, reflected and stray radiation will be referred to as scattered radiation.) These rays shower the room and cause whole body radiation. The farther the operator stands from the patient, however, the less radiation he receives. This is based on two principles: (1) the inverse square law of radiation and (2) air absorption of scattered rays. Unfortunately, because of lack of space in the dental office and the employment of untrained assistants, dentists do not take advantage of these safeguards.

The roentgen and the milliroentgen (1/1000 r) will be used as standards of measurement of scattered radiation.

Assistant professor, department of medicine, University of Texas Dental School.

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3. Lorenz, Egon. Biological studies in the tolerance range. Radiology 49:274 Sept. 1947.

BIOLOGICAL EFFECTS OF RADIATION

The three greatest biological effects occurring after exposure to continued radiation are: (1) a disturbance of the hematopoietic system,[3] (2) a carcinogenic influence and (3) possibility of mutation. It is well known that absorption of ionizing radiation by tissue is connected with damage, however small the dose.[4] This damage, in spite of not being manifested in clinical signs and symptoms, may result in a shortening of the life span, or cause mutation changes that may not become apparent for generations. There is doubt in some men's minds that the human body has any tolerance for radiation.[5] The effects of radiation can be apparent or obscure, and these effects can be influenced by variations in individual predisposition and resistance.

The permissible dose of 0.1 r (100 milliroentgens), chosen five years ago for the plutonium projects, was based on incomplete scientific data. This level of 0.1 r per day chosen for plutonium projects is not as low as it should be.[6] Physicists who deal with health matters consider 100 mr as the maximum permissible dose of radiation and about 10 mr per day as the permissible operating dose. The National Committee on Radiation Safety recently has reduced the permissible dose to 300 mr (.3 r) per week. No employee at Oak Ridge is now permitted to receive more than an average of 200 mr per week.

In experiments carried out at Oak Ridge, animals were exposed to varying degrees of radiation.[7] Records were kept, and the animals were autopsied. Most of the changes were hematological and carcinogenic. Guinea pigs (animals which respond to radiation in a manner similar to man) developed lymphopenia after receiving 319 r of radiation at 1.1 r per day. The commonest cause of death among these radiated animals was an acute onset of a severe anemia. The hematopoietic tissue never completely recovers from radiation damage.

Carcinogenic effect showed itself in the occurrence of tumors of various tissues in test animals. Lymphatic leukemia, lung cancer and osteosarcoma were found in animals, and all of these developed when the animals had received 2.2 r per day.

Sterility in males can occur after exposure to 100 mr per day and in females after exposure to 20 mr per day. The male organ recovers much more easily than the female. The condition may be reversible in males if radiation ceases but is irreversible in females. In spite of the fact that the male may recover, it is possible that mutation occurs in the chromosomes of the cell that may show up in later generations.

Hohl reports definite changes in cell mitosis with radiation exposure.[8] Cells in the early and late metaphase of mitosis displayed pyknosis after being exposed to 100 r within a period of 45 minutes.

The high mortality rate from cancer among roentgenologists may be of special significance when viewed in conjunction with the mortality rate from leukemia. Although roentgenologists and radiologists constitute only 4.3 per cent of specialists, 25 per cent of the deaths from leukemia were in this group.[9]

The safe dose in relation to blood changes is approximately 10 mr per day.[10] As little as 20 to 50 mr per day

4. Lorenz, Egon. Some biological effects of long continued irradiation. Am. J. Roentgenol. 63:176 Feb. 1950.

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10. Sievert, R. M. Tolerance dose and prevention of injuries caused by ionizing radiation. Brit. J. Radiol. 20:306 Aug. 1947.

can produce blood changes in predisposed individuals.

Superficial symptoms of radiation may manifest themselves in anxieties, nervousness, anorexia, apprehension and a feeling of tiredness.

The seriousness of this problem can be seen when it is realized that the radiation received in the dental office is cumulative, and it may be that last exposure that causes the damage, the one from which an operator may not recover easily. Muller[11] states,

> The frequency of the mutations induced by radiation depends on the total exposure and not upon how the dose was distributed in time. That is to say, a given dose applied in the form of a very short intense treatment will induce the same number of mutations as the total dose when it is divided into a large number of parts.

There is popular belief, not substantiated by scientific data, that some of the accumulated radiation is dissipated when the individual is away from radiation. If the dentist is out of his office one day each week, he will lose approximately 1/7 of the radiation received that week, or if he takes a month's vacation per year he will lose 1/12 of one year's absorbed radiation.

The problem, then, is to measure the amount of scattered radiation which may be received as absorbable ionizing radiation in the dental office.

PROCEDURE AND EQUIPMENT

The equipment used in this study was: one Beckman charging unit, one Beckman dosimeter, four ionization chambers and one minometer for measuring the ionization chambers. The four ionization chambers were placed at varying distances from patients who were having full-mouth roentgenograms taken. They were left in that location for some time and then read. The Beckman dosimeter was attached to the clothing of operators while they were taking roentgenograms and was read immediately after exposure. These instruments are being used in laboratories and plants in which men work with radioactive material and high voltage equipment. They are preferred over calibrated exposure film because they lessen chances of human error in reading and developing. Three well known brands of machines were used. They were set at 60 kv.p. and 10 milliamperes; an average exposure of three and a half seconds was used.

The purpose of the study was to determine the amount of scattered radiation in a dental office which was received by operators on various parts of their bodies while they were standing at varying distances from the patients. Based on this data certain suggestions will be made relative to protection of the dentist from ionizing radiation.

OBSERVATIONS

1. The ionization chamber was placed 6 feet high and 5 feet in front of the patient who was having roentgenograms taken. After 600 periapical views were taken, the amount of scattered radiation recorded was .25 mr per film.

2. The ionization chamber was placed 6 feet high, 24 feet away from and 45 degrees to the front of patients. After 1,000 periapical views were taken, the chamber recorded an average exposure of .05 mr per film.

3. The ionization chamber was placed 5 feet high and 15 feet in front of the patient. After 600 periapical views were taken, the chamber recorded .16 mr per film.

4. The ionization chamber was placed 5 feet from patient at 45 degrees to the front of the face at head level. The chamber revealed .38 mr of exposure per film after 263 views were taken.

Table 1 shows that the amount of scattered radiation decreased greatly with the

11. Muller, H. J. Radiation damage on the genetic material. Am. Scient. 38:33 Jan. 1950.

Table 1 • Amount of scattered radiation

Distance from patient	Position of chamber	Average exposure	
		Per film	14 film
5 ft.	In front of patient	.25 mr	3.50 mr
24 ft.	45° in front of patient	.05 mr	.70 mr
15 ft.	In front of patient	.16 mr	2.25 mr
5 ft.	45° in front of patient	.38 mr	5.32 mr

increase of distance from the patient, and apparently slightly more radiation was picked up when the chamber was at a 45 degree angle in front of the patient's face. The inverse square law of radiation (amount of radiation is inversely proportional to the square of the increase in distance) did not seem to apply in this experiment.

With the Beckman dosimeter placed in the breast pocket of the operator, who stood behind the roentgen-ray head and 3 feet away from the patient's head, it was recorded that the operator received .99 mr exposure per film.

With the dosimeter placed at nose level and the operator standing behind the roentgen-ray head, 3 feet from patient, he received .3 mr exposure per film. This is a position frequently used.

With the dosimeter placed at knee level and the operator standing behind the roentgen-ray head and 3 feet from patient, he received .25 mr per film. As the distance of the dosimeter increased, the amount of radiation recorded decreased greatly.

Table 2 indicates that the amount of scattered radiation received by the chest is greater than that received by other parts of the body; presumably it is closer to the part of the face which is being roentgenographed. The decrease of radiation with increased distance closely approximates the inverse square law of radiation.

If a dentist takes three full-mouth roentgenograms a day, standing 3 feet from the patient and behind the roentgen-ray head, it is possible he may absorb a pathologic dose of radiation in one week.

Table 2 • Amount of scattered radiation received by various parts of the body

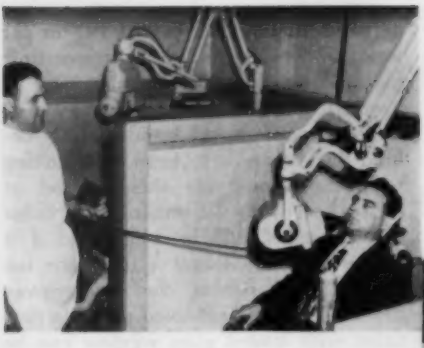
Body level	Distance of operator from patient	Position of operator	Average exposure	
			Per film	14 film
Chest	3 ft.	Directly behind x-ray head	.99	13.8
Nose	3 ft.	Directly behind x-ray head	.30	4.2
Knee	3 ft.	Directly behind x-ray head	.25	3.5
Chest	5 ft.	Directly behind x-ray head	.25	3.5
Chest	10 ft.	Directly behind x-ray head	.91	.14

Table 3 • Amount of scattered radiation received when operator stood at various distances from patient

Distance of operator from patient	Position of operator	Body level	Average exposure	
			Per film	14 film
3 ft.	At side of x-ray head	chest	2.0 mr	28 mr
3 ft.	At side of x-ray head	knee	.8 mr	11.9 mr
3 ft.	At side of x-ray head	nose	1.50 mr	21 mr
5 ft.	At side of x-ray head	chest	.50 mr	7. mr
10 ft.	At side of x-ray head	chest	.025 mr	.35 mr

With the operator standing at the side of the roentgen-ray head, a startling difference in exposure was noted. When he stood at a distance of 3 feet from the patient and to the side of roentgen-ray head, the operator received 2 mr per film at chest level, .85 at knee level, and 1.5 mr at nose level. When he stood 5 feet from the patient and at the side of roentgen-ray head, he received .5 mr; when standing 10 feet from the patient he received .025 mr (Table 3).

It is apparent that if the operator stands at the side of the roentgen-ray



The operator should try to stand at least 5 or 6 feet from the patient and directly behind the roentgen-ray head

In offices with limited space it is advisable to have a portable lead-lined partition. Standing 3 feet from patient is inadvisable

Standing at the side of the roentgen-ray head and close to patient is considered dangerous. An operator will receive twice as much radiation in this position as he would receive if standing directly behind the roentgen-ray head

Untrained assistants often expose themselves to dangerous radiation by standing in vulnerable positions close to patient

It is unwise to have an assistant operate a timer switch unless she is behind the roentgen-ray head. In the position shown she not only exposes herself to scattered radiation but is also standing in the cone of dispersion of the primary radiation

head instead of directly behind the primary ray, he will receive approximately twice as much scattered radiation. If he stands at the side of the roentgen-ray head and 3 feet from the patient, it is possible to absorb a pathologic dose of radiation in one week if he takes one to two full-mouth roentgenograms per day. The illustration shows errors made in daily dental practice.

SUMMARY AND CONCLUSIONS

Scattered radiation has the same effect on the body as any other ionizing radiation. This radiation is cumulative in the body[12] and can be responsible for mutations, blood changes and tumor growth. It is impossible to measure the amount of dissipation of cumulative ionizing radiation, and presumably the figures quoted will vary with individuals and their environment. The scattered radiation received by dentists in the dental office is whole body radiation. Scattered radiation is sufficiently penetrating to reach bone marrow.[13] The amount of scattered radiation will depend to a large degree on the position the operator takes while taking roentgenograms and the distance from the patient. The allowable operating dose should never exceed 300 mr per week, and evidence at the present time indicates that this figure may soon be lowered to 200 mr per week.

The dentist should stand directly behind the roentgen-ray head when taking roentgenograms.[14] He should stand at least 5 feet from the patient. The timer switch cord should be lengthened if it is short. If an assistant is used, she too should stand behind the roentgen-ray head. A ⅛ inch lead-lined portable partition with leaded glass window can be used to shield the operator. Assistants should be informed regarding the hazards of radiation. Film should never be held in the patient's mouth by the operator.[15] Fast film should be used whenever possible to reduce exposure time.

Dentists should take as much vacation as possible since some of the accumulated radiation is dissipated when the individual is out of his office.

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Reason • Good sense or reason must be better distributed than anything else in the world, for no man desires more of it than he already has. *René Descartes, "Discourse on Method," 1637.*

Effects of air abrasive in prophylaxis

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Prophylaxis of the teeth, one of the most important steps in a program of preventive dentistry, should have little effect on the surface of the tooth enamel. Enamel examined at high magnification has a characteristic appearance. Variations occur in different teeth and also in different areas of individual teeth.

In general, the enamel of a newly erupted tooth has a covering spoken of as the cuticle. Enamel cuticle shows structural detail similar to the outer enamel layer. This layer is completely covered with pronounced perikymata at the rod ends. When enamel surface is removed, enamel rod ends at the crests between the perikymata at the highest contour and most accessible region of the surface disappear first. This is followed by generalized loss of rod ends, a rapid flattening of the perikymata, and subsequent disappearance. Proximal surfaces of all teeth retain their structural detail much longer. Perikymata have been described as external manifestations of the ends of the striae of Retzius.[1] Decrease in the concentrations of perikymata from the cementoenamel junction to the occlusal or incisal edge of the surface has been demonstrated. In addition to the normal appearance, characteristic surface cracks can be found which may penetrate through the enamel. Cracks actually may be the surface manifestations of lamellae. It is evident that through wear the enamel surface will lose some of these characteristics and become smooth because of the natural milling or grinding of the occlusal contact and because of the polishing action of the diet.

Prophylaxis of the teeth by means of scalers and a polishing cup with pumice or silex as the abrasive will leave a visibly smooth, highly polished surface. Enamel surface will be removed in the process; the amount removed will depend on the length of time of application, type of abrasive used and the pressure applied. The length of time of application usually is determined by the amount of stain present on the surface. Although there is surface loss, the enamel is left smooth and resists the accumulation of stain and calculus for a long time.

Prophylaxis with the air abrasive, dolomite, creates a complex problem. The surface stain is removed easily in a short interval of time, but the surface is left badly eroded and with a characteristic dull appearance. The question then arises as to the desirability of this rough dull surface which will be left after the prophylaxis. It is not known whether this

This study was supported in part by funds from a research grant, Contract No. V100(M-154), from the Veterans Administration.

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surface accumulates stain and calculus quicker than does the polished surface which is left after the use of a polishing cup and abrasive.

Surface loss of enamel through a prophylactic procedure may be serious when a patient has a routine prophylaxis every six months. It is known that the thickness of the enamel surface varies from 2.0 mm. at the height of the cusps to 0.1 mm., which is equal to 100 microns, in the cervical region. It is possible, by repeated applications of the abrasive by means of the polishing cup or the Airdent, to damage greatly or to remove this enamel surface.

The method of measuring surface loss by means of the Knoop indentations as reported by Souder and Schoonover was tried without success[2, 3] because the detail of the indentations was destroyed by the abrasive action. A modification of this method was employed and was found to be satisfactory for the measurement of surface loss. This modified method consisted essentially of making indentations in the tooth surface and recording the dimensions of the indentations. The air abrasive was then applied, after which a new indentation was made in the abraded surface and the measurement of the second indentation recorded. The tooth surface was then restored to a polished condition by the use of silex in a rubber cup, after which measurements of the original indentations again were made. The depth of the surface layer removed could be computed from the difference in the two measurements.

Teeth were placed in small copper rings and were supported with black impression compound. Surfaces were ground flat and polished with fine emery paper and levigated alumina. Small Knoop diamond indentations were made across the surface at various intervals. These indentations were measured with a micrometer microscope (Fig. 1). The load applied to the diamond indenter was 1,100 Gm. By measuring the original length of the indentation and the length after the surface is abraded, the depth of the indentation can be calculated according to the following formula:

$$x = \frac{0.4618\ (L_1 - L_2)}{2.\ \tan\ \frac{136}{2}} = \frac{.4618\ (L_1 - L_2)}{4.950} =$$

$$.093\ (L_1 - L_2) = \text{answer in microns}$$

DESCRIPTION OF TESTS

Approximately 1 sq. cm. of enamel was marked so as to approximate the average surface area of a central incisor. The total labial surface area for a central incisor has been found to be approximately 81 sq. mm. In the samples studied, approximately one half of the surface was covered with tape to prevent surface etching by the air abrasive.

Previous experimental work by other investigators has shown the importance of various factors in the use of air abrasives.[4-6] To conform to accepted practice, the following recommended conditions were observed in this study.

1. Distance of the nozzle from the tooth surface was 15 mm. From this distance, one half the exposed surface was covered in one pass with the air abrasive jet.

2. Angulation was 45 degrees with respect to the enamel surface. Deviation from 45 degrees toward 90 degrees increased the surface etching and reduced the coverage of the surface.

2. Scott, D. B., and Wyckoff, R. W. G. Shadowed replicas of tooth surfaces. Pub. Health Rep. 61:697 May 17, 1946.

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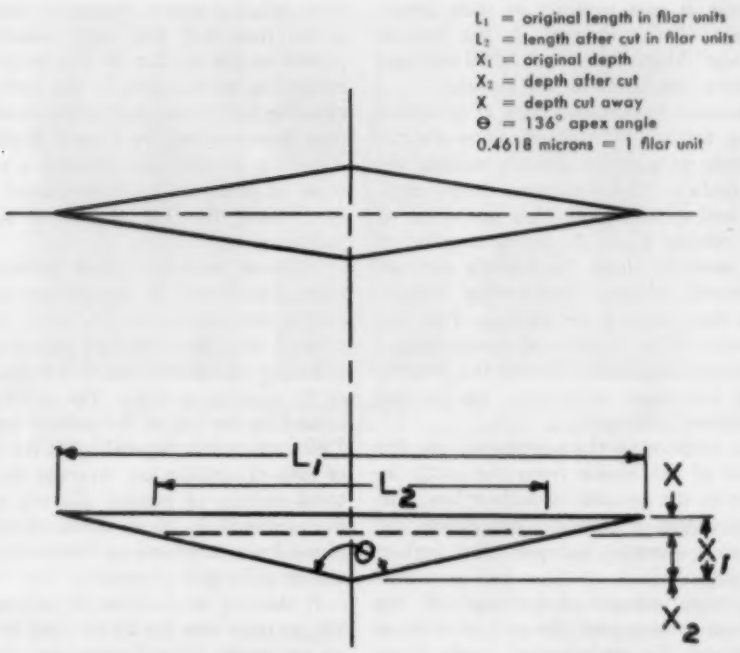

Fig. 1 • Method of calculating wear by the use of the Knoop indentation

3. Surface etching was proportional to the time per unit area. Time exposures of 1, 1.5 and 2 seconds were used for an area of ½ sq. cm.

4. Rate of flow of the particles was 45 on the instrument control.

5. Air pressure was 45 pounds.

In order to standardize the procedure, an apparatus was constructed to control the distance, angulation and exposure time. The apparatus consisted of a motor which pulled a small car with the attached handpiece over a track. The speed of the car was controlled by means of a rheostat connected to the motor. The distance and angulation were controlled by adjustments on the car and handpiece.

After exposure to the air abrasive for 1, 1.5 and 2 seconds, the samples were placed under the microscope of the Tukon tester to measure the length of the original indentation. The indentations were disfigured to varying degrees, depending on the time of exposure and angulation. The disfigurement was such that accurate measurements were impracticable. Particles striking the surface would in some instances actually increase the length of the indentation.

Examination of the surface revealed a definite etching, with deeper penetration and cutting in the natural cracks and around the Knoop indentation. An increase in the angulation toward 90 degrees brought about a deeper penetration and severe etching. It is evident that surface enamel was lost, but accurate measurement of the exact amount could not be determined readily from microscopic measurements on the etched enamel surface.

The collodion replica technic described by Scott and Wyckoff was used on the exposed surfaces. Through the use of this

technic it was possible to take photographs of the changes in the enamel surface.[7] Magnification of X250 was used to show the effect on the surface.

Increase in the angulation of the handpiece toward 90 degrees increases the number of particles directly striking the flat surface. This produces a deeper etching and greatly diminishes the width of the cutting path. At lower angulation, the particles strike the surface and are deflected without penetrating deeply; thus they produce less etching. The consistency of the operator in maintaining a 45 degree angulation during the prophylaxis procedure determines the amount of enamel destroyed.

In addition to the angulation, the distance of the nozzle from the tooth influences the amount of surface loss. The combination of incorrect angulation and distance greatly increases the surface etching.

Several natural conditions of the enamel surface were changed in order to carry out this experimental work. Outer enamel has a much higher hardness number as compared with subsequent layers beneath.[8] In order to get a flat surface, it was necessary to remove the outer enamel surface and all characteristic phenomena such as the perikymata. Any remnants of the enamel cuticle were removed in the polishing operation.

The curved surface of the tooth is another factor which necessitates a difference in the angulation of the air nozzle. The surface that has a wavelike appearance allows the particles to strike the surface with greater intensity and thus create greater destruction in the area of the crests in respect to the troughs.

After exposure to the abrasive jet, the samples with one half of the surface protected by tape showed a definite line of demarcation. It was possible, by placing the samples repeatedly under a magnified light, to determine when this surface had been repolished with silex and a rubber cup to the degree that they had regained their original luster. Accurate measurements indicated that the indentations placed on the surface for the purpose of measuring surface loss by the cutting or cleaning had diminished to the point that they appeared only as a small black line. After the surface was cleaned, a second series of indentations were placed on it to measure the loss caused by the repolishing.

In most instances these indentations were diminished to approximately one half of the original length. It can be calculated that the combined cleaning and polishing operations caused a surface loss of 30 microns or more. The surface loss caused by the use of the rubber cup was 2 microns or less, depending on the length of time of application. Average time per tooth surface of enamel did not exceed five seconds in most cases. Even less enamel was removed on teeth where no visible stain was present.

If staining or calculus is present and the operator uses the air abrasive to clean all the teeth, he will remove significant amounts of enamel and will leave a rougher surface than was there previously. To restore the original finish, it is necessary to repolish all the surfaces and thus cause an additional surface loss which is greater than the initial loss caused by the cleaning.

DISCUSSION OF ILLUSTRATIONS

The micrographs included herein were taken from collodion replicas, shadowed with chromium. The enamel surface as shown is not the outer enamel layer, but a deeper part of the enamel which remained after the surface was flattened and repolished. It was necessary to flatten the surface in order to place the Knoop indentations (Fig. 2, left).

7. Scott, D. B., and Wyckoff, R. W. G. Studies of tooth surface structure by optical and electron microscopy. J.A.D.A. 39:275 Sept. 1949.

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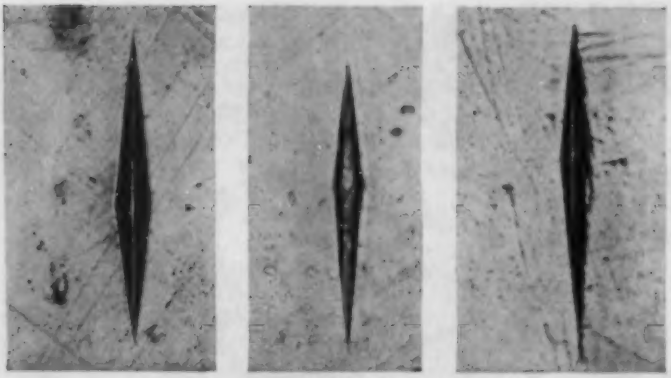


Fig. 2 • Left: Original unpolished indentation in tooth enamel. Center: Surface loss after 5 seconds' exposure to silex applied with rubber cup. Right: Surface loss after 10 seconds' exposure to silex applied with rubber cup

The condition of the enamel surface after 5 seconds' exposure to silex and a rubber cup is shown in Figure 2, center. Approximately 1 lb. hand pressure was exerted, and the speed was about 3,000 rpm. Some loss of detail and reduction in the original length of the indentation occurred. The amount of surface reduction was so slight, however, that it was impossible to calculate it.

Figure 2, right, shows a similar enamel surface after 10 seconds' exposure under the same conditions as were used for Figure 2, center. Surface reduction and detail loss were great enough so that the enamel loss could be figured. The surface loss, determined according to the formula described earlier, was 2.32 microns. It seems obvious that the surface loss will be greater if the rubber cup is run at longer intervals, but from previous experimental work done by the periodontic staff of the University of Michigan, School of Dentistry, it was felt that the average time needed per surface to clean a tooth is approximately five seconds.

The condition shown in Figure 3, left, demonstrates the effect on the enamel of the air abrasive after exposure of one second at an angulation of 45 degrees. The least possible damage to the surface occurs when this angulation and exposure time are used. As demonstrated in the micrographs, the surface etching is more severe as the exposure time and angulation increase. The use of the Tukon tester with the Knoop indenter to measure the surface loss was unsuccessful, unless the roughened surface was repolished and the depth calculated, for the following reasons:

1. With low exposure time and at an angulation of 45 degrees, the surface was not uniformly reduced. The particles of dolomite penetrated the surface in scattered areas.

2. The particles, being fairly large in size, would damage or completely remove the small pointed ends of the Knoop indentations which are the basis of measurements.

3. As the time of exposure increased, the indentations were further destroyed, and accurate measurements were impossible.

In Figure 3, center, is shown the enamel surface after 1.5 seconds' exposure with the angulation at 45 degrees. An increase in the amount of particle penetration per unit area should be noted.

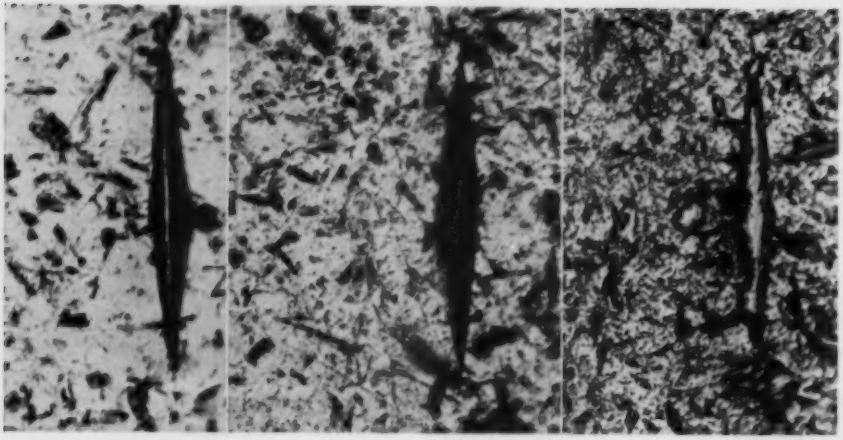


Fig. 3 • Left: Forty-five degree angulation—1.0 second's exposure to air abrasive. Center: Forty-five degree angulation—1.5 seconds' exposure to air abrasive. Right: Forty-five degree angulation—2.0 seconds' exposure to air abrasive

The variation in the effect of particle size or sharpness can be seen in this micrograph since the larger particles caused severe etching. The result of a 2.0 seconds' exposure and 45 degree angulation is shown in Figure 3, right.

The condition shown in Figure 4 demonstrates the increase in surface loss when the angulation changes from 45 degrees to 90 degrees. At an angulation of 90 degrees and with the time comparable to that used at 45 degrees, the particle pene-

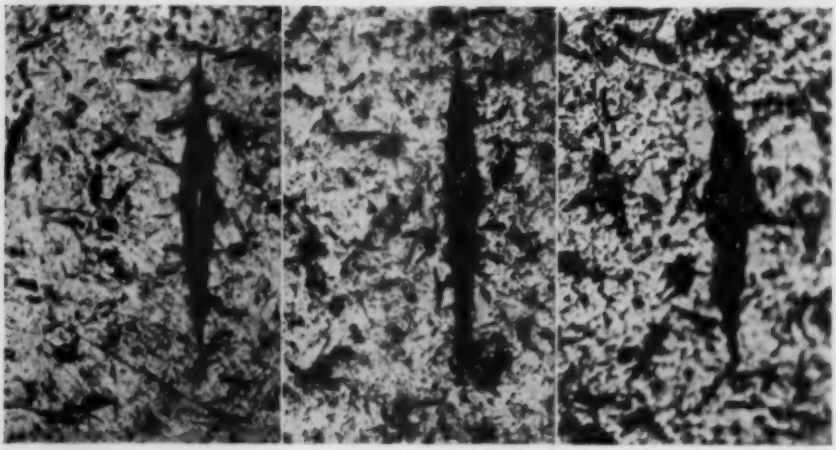


Fig. 4 • Left: Ninety degree angulation—1.0 second's exposure to air abrasive. Center: Ninety degree angulation—1.5 seconds' exposure to air abrasive. Right: Ninety degree angulation—2.0 seconds' exposure to air abrasive

tration per unit area has increased to such a degree that none of the original surface can be seen and much of detail of the indentations has been destroyed. This surface would require extensive polishing to restore it to a smooth glossy finish.

move this roughness, the enamel loss must be considered part of the prophylactic procedure. Samples which had been exposed to the air abrasive were again placed under the indenter of the Tukon tester and a new series of indentations placed across the surface in close ap-

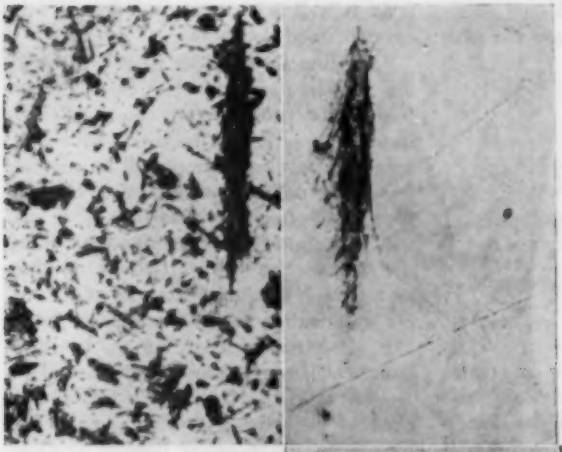
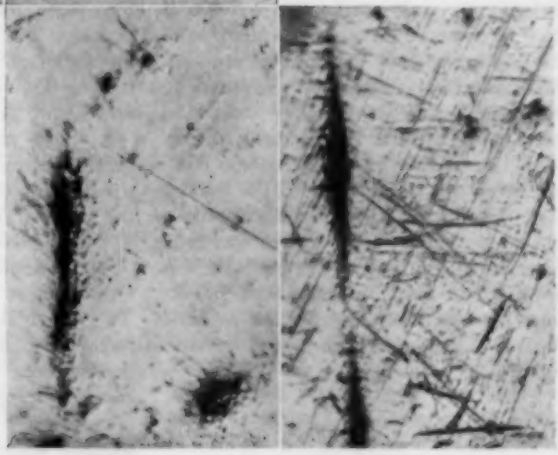


Fig. 5 • Left: Forty-five degree angulation—1.0 second's exposure to air abrasive. Right: Forty-five degree angulation—1.0 second's exposure to air abrasive. Repolished with silex and rubber cup



Left: Forty-five degree angulation—1.5 seconds' exposure. Repolished with silex and rubber cup. Right: Forty-five degree angulation—2.0 seconds' exposure. Repolished with silex and rubber cup

The question as to whether this rough surface which may accumulate stain and tartar rapidly should be left must be considered. If the tooth is repolished to re-

proximation to the original series of indentations as shown in Figure 5, above left. Measurements were made of these new indentations before and after polish-

ing, when a rotary type instrument such as the rubber cup and silex had been used. The effect of this polishing is shown in the series of conditions shown in Figure 5, above right, and below. The difference in depth of the indentations was computed from length changes which represented the surface loss during the polishing operation. The various estimated surface losses for different angulations and exposure times are listed in the table.

Table. Surface loss in microns

Angulation in degrees	Time of exposure in seconds 1.0	1.5	2.0
45	6.41	7.0	17.2
60	19.9	25.3	25.0 plus
90	25.0 plus	25.0 plus	25.0 plus

Surface loss with 60 degree or greater angulation for 1.5 seconds was so great that accurate measurements of the Knoop indentation could not be made. A loss of 25.0 microns or more was evident from the diminished size of the indentations. Because visual inspection was used to determine when the original luster had been restored, some of the teeth still revealed microscopic evidence of the etching after the polishing with the rubber cup. The original Knoop indentations placed before the air abrasive was used to clean the surface had completely disappeared in most instances after polishing. The average depth of the original Knoop indentation was about 50 microns.

CONCLUSIONS

1. Correct angulation, distance and time of exposure will determine the severity of etching on the enamel surface. It is difficult to maintain these conditions, especially in the posterior region of the maxilla.

2. Repeated applications of this type of prophylactic procedure will in time reduce the enamel surface, especially at the cervical margins, to a point that little or no protection will be afforded the dentin.

3. Cracks, fissures and margins of restorations will be eroded and opened, and this will allow early entrance of bacteria as well as the accumulation of calculus or food debris.

4. When the Airdent is used, surface loss will in most instances be less than 5 microns, provided all the conditions stated previously are followed with precision. In addition, there will be surface loss in the polishing operation to remove the etched effect of the surface. This loss will be greater than the amount lost in the initial cleaning. Polishing of this surface will necessitate the use of a rubber cup with a suitable polishing paste.

5. Prophylaxis when the rubber cup is used will remove tooth structure. The amount of loss will depend on the type of abrasive used, the pressure applied to the handpiece, the length of time of application and the number of revolutions per minute of the handpiece. The surface at the completion of the operation is smooth and highly polished.

6. The particles of dolomite vary greatly in size; the larger particles cause the deeper etch marks as can be seen in the micrographs. Some standardization of particle size would reduce the severity of etching and the discomfort to the patient because of the stinging.

7. Angulation of 45 degrees, which is recommended by the manufacturer of the Airdent unit, will not clean the cervical margins of the teeth. This was demonstrated by the use of a disclosing solution after the application of the air abrasive. The cervical margin is the most important area for hard and soft deposits and should be cleaned thoroughly. The question of subgingival calculus must be considered; the air abrasive will not remove the calculus below the normal epi-

thelial attachment of 1 to 2 mm. Deep pockets which usually contain deposits of calculus would not be cleansed. The deeper calculus is most important as a causative factor in periodontal disease.

8. The air-abrasive type of prophylaxis seems contraindicated in most routine cases when the deposit and staining are not severe. The recognized method of prophylaxis with scalers and rubber cup will remove these small deposits quickly and with a minimum of enamel loss. The only complaint patients have against a prophylaxis is the pain caused by the scalers. It is felt that this new method of prophylaxis will not supersede the older method.

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Use of pins in difficult cases

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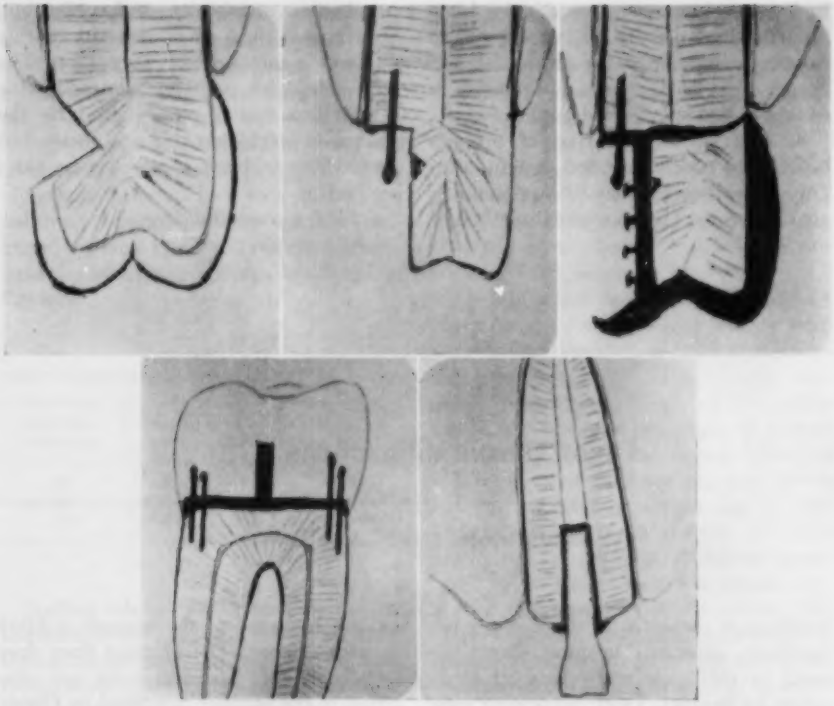
Problems of reconstruction frequently tax ingenuity, especially in cases where the tooth or teeth are to be used as abutments for bridges. Teeth presenting such problems are teeth with fractured cusps, teeth with horizontal triangular cuts in the buccogingival region, sometimes extending halfway into the tooth (illustration, above left), and teeth with a complete fracture of the crown. In most cases, such teeth, especially those in which the difficulty has been caused by abrasion, are vital. If the ordinary cast veneer crown is attempted in the more favorable cases—those involving teeth with remaining cusps—there is always the possibility of fracture. It is not advisable to extirpate the pulp in such cases because the canal or canals are almost entirely obliterated. Many of these teeth can be salvaged by the use of technics common in the construction of pinledges.

If the lingual cusp has not broken off, the tooth is prepared for a cast veneer crown, the buccal portion being reduced to the extent of the cut. If the cut is excessive, the apex of the triangle is filled in with cement. The gingival floor may be leveled off. The pin holes are prepared in the manner described by Goodman[1] for making pinledges. The holes are placed strategically in the horizontal floor, mesially and distally, halfway between the pulpal wall and the root surface. The cutting of the holes is started with a spear-shaped drill that has been made by flattening three sides of a half-round bur with a carborundum disk. The holes are drilled parallel to the general preparation to a depth of 2 to 3 mm., depending on the sensitivity of the tooth. Next a new half-round bur is used to free the holes to their full depth; the bur is used in the holes alternately to keep them parallel. A piece of iridioplatinum wire, gauge no. 24, is cut off at least twice the length of the hole. The end to be inserted is filed smooth, and the other end is flattened so that it can

1. Goodman, Charles, Pinlock attachment for anterior bridgework, New York J. Den. 21:204 May 1951.



Above left: Horizontal cut extending halfway into tooth. Above center: Pins in position for taking of impression. Above right: Casting model with pins in place. Below left: Cast base fitted to stump. Below right: Bur inserted in canal

engage the impression material. With the pins in position (illustration, above center) a well-fitted band is filled with inlay wax, and the impression is taken. The removal must be made without torsion. The usual wax bite is then taken; to protect the preparation, care is taken that the temporary material does not enter the pin holes.

The impression is filled with heavy casting investment plaster with enough excess to make a fairly long workable stump. When set, the wax is flamed in the Bunsen burner and removed. As each successive layer becomes molten, it is flicked off until all that remains is a wax-impregnated model. If held too long in the flame, the investment tends to become powdery. The wax bite is prepared by removing that part of the buccal wax that might engage the pins. The model is trimmed so that the root portion is conical. Tin foil is adapted to the conical root to act as a separating medium before the model is placed in the bite. Soft wax, such as counter or utility wax, is pushed into those regions from which it is necessary to exclude the plaster or stone. Only the heat of the fingers is needed to soften the wax. After the model and counter are poured, set and separated, the casting model is removed and waxed directly (illustration, above right). The waxed-up case is first

thoroughly soaked in water before the final investment. It is usually necessary to relieve the casting around the pins.

In those cases in which the entire crown has broken away, extra pins are used. The investment model is made in the same manner, but no bite is taken at this time. Only the base is cast. This is fitted to the stump (illustration, below left), the wax bite is taken, and a plaster impression is made. Part of the sprue has been retained to facilitate seating in the plaster. In those cases where there is enough room, it is possible to cast the pins by preparing the holes with a no. 700 bur. Prepared acrylic pins are used that fit the holes exactly and which will burn out in the casting process.

Among the ideas inherited from the Richmond crown days of dentistry is the use of clasp wire in making a cast base. Since the introduction of the casting process, the wire has been retained even though it almost always interferes with the securing of an accurate casting of the canal. There seems to be no reason why the post cannot be cast without the wire. The method suggested is to ream out the canal with a no. 702 bur to the full length of the blade. An old no. 702 bur is broken off so that enough of the shank is left to engage the impression material. The old bur is heated slightly in the flame, covered with a molten inlay wax and inserted in the canal (illustration, below right). An over-all impression is taken with inlay wax in a well-fitted band. The subsequent steps are the same as those for making the wax-impregnated model. For the smaller canals it may be necessary to use a smaller bur. After the cast base is made, the subsequent steps are the conventional ones.

There are many other situations where this technic can be used with some modification in handling. One of them is the direct waxing of three-quarter crowns, especially when auxiliary pins are to be used. In these cases the band is removed in the mouth, the margins are trimmed, and the undercuts are removed. The bulk of the wax is retained for easier handling. The same type of wax-impregnated model is made, and the waxing is done on the model. In anterior teeth no bite is needed, since the lingual portion has been reduced to the thickness of sheet casting wax. If no. 24 gauge wax has been used to test the clearance, it is used also to cover the lingual surface in the waxing.

Used with a little ingenuity, the wax-impregnated model will facilitate reconstruction in many otherwise difficult cases.

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Facts • It doesn't matter so much what the facts really are, but what people think they are. *Anonymous.*

in the treatment of a variety of lesions and diseases where cellular debris and slough have been contributing factors. These include bronchopulmonary disease,[19, 20] osteomyelitis,[7] subcutaneous hematoma,[7] postoperative anorectal surgery,[21] miscellaneous chronic ulcerative cutaneous lesions,[7, 14] infected wounds[22] and endodontitis.[23] A highly purified trypsin has recently been administered intravenously for pathologic entities, such as thrombophlebitis.

Thus, it has been adequately demonstrated that enzymatic débridement with trypsin is effective in promoting the healing of a variety of lesions where sepsis and necrosis are present. The fundamental mechanisms of these pathologic processes are sufficiently similar to those of periodontal disease to lead to the academic conclusion that enzymatic treatment of oral lesions warrants investigation. It is for this reason that the following path-finding study has been made.

DESCRIPTION OF TRYPSIN

Purified crystalline trypsin is a proteolytic enzyme derived from mammalian pancreas glands. It débrides septic lesions by effecting the breakdown of proteins, denatured proteins, fibrin, mucin, peptones and split protein products. The end products are simple polypeptides and some amino acids.[14] Trypsin can hydrolyze many types of proteins but possesses only a weak action on native proteins in contrast to a very rapid action on denatured proteins.[24] It digests coatings of desoxyribonucleoprotein of the purulent exudates and then attacks the dead tissue of the lesion.[14] Trypsin is innocuous to living tissue because the serum and the membranes of living cells contain a specific trypsin inhibitor and because there are several nonspecific inhibitory substances which protect viable tissue from its proteolytic action.

Trypsin is not bactericidal, and diminution or disappearance of invading organisms accompanying the lysis of debris and slough is apparently a secondary mechanism due to the appearance of fresh leukocytes and the resultant increased phagocytosis of bacteria. The medium for bacterial growth is removed by elimination of necrotic debris.[25] There is, however, evidence that local concentrations of trypsin inhibit the growth of some bacteria and that others are altered sufficiently to be unable to withstand changes in their environment.[26] Both penicillin and streptomycin may be mixed with solutions of trypsin and used locally[7] to enhance their antibiotic potency in preventing bacterial growth.[20]

The enzyme trypsin is not dependent for its activation on the presence of other substances which may or may not be present in the lesion in significant quantities. The continuation of trypsin therapy beyond the point where débridement is complete has been reported to be of benefit. This conclusion is based on the following observations by Reiser and others:[26] (1) the elimination of surface coagulation which tends to form before granulation tissue formation is complete, (2) continuing stimulation to the lesion to produce an exudate abundant in neutrophils, (3) increased potency of antibiotics in preventing bacterial growth, (4) prevention and inhibition of bacterial

19. Reiser, H. G.; Roettig, L. C., and Curtis, G. M. The tryptic débridement of fibropurulent empyema. In Surgical Forum, 1950; proceedings of the Forum sessions of the 36th Clinical Congress of the American College of Surgeons, Wangensteen, Owen. Philadelphia, W. B. Saunders Co., 1951, p. 17-24.

20. Limber, C. R., and others. Enzymatic lysis of respiratory secretions by aerosol trypsin. J.A.M.A. 149: 816 June 28, 1952.

21. Burleson, J. S. The use of trypsin in postoperative anorectal surgery. Am. J. Proctol. 3:59 March 1952.

22. Chandler, B. F. Medical débridement by enzymatic action. U. S. Armed Forces M. J. 3:1209 Aug. 1952.

23. Auslander, W. P., and Roth, H. Tryptar—its application in endodontics. A preliminary report. Oral Surg., Oral Med. & Oral Path. 6:898 July 1953.

24. Haurowitz, F., and others. The action of trypsin on native and denatured proteins. J. Biol. Chem. 157: 621 Feb. 1945.

25. Roettig, L. C., and others. The use of trypsin in chest disease. Dis. of Chest 21:245 March 1952.

26. Reiser, H. G.; Roettig, L. C., and Curtis, G. M. Selective physiologic débridement with topical tryptic enzymes. Am. J. Surg. 85:376 March 1953.

growth in the presence of tryptic enzymes and (5) the fact that continued application of tryptic enzymes does not affect the healing process.

METHODS

Trypsin is available commercially as a crystalline powder in rubber-stoppered vials, in which form it is stable indefinitely at room temperature. When diluted with ampules of Sorensen's phosphate buffer solution, pH 7.1, 40 to 50 per cent of the enzyme's proteolytic activity is dissipated within three hours. Thus, when trypsin is used in a solution for wet dressings, irrigations or for infiltration into necrotic tissue, it must be prepared fresh immediately before each application. Trypsin exhibits its greatest activity at pH 7.1 but is effective through a range of pH 5 to pH 8. Since the hydrogen ion concentration of saliva is most commonly between 6.4 and 7.1, with this solution proteolytic activity in the oral cavity is at or near maximum. The pH of the region to be treated may be adequately tested by the use of nitrazine paper and its colorimetri : index. For assurance of optimum activity, the hydrogen ion concentration of the region should be adjusted by irrigating it with the Sorensen's solution just prior to application of trypsin powder or solution. Interproximal embrasures and pockets may be irrigated with Sorensen's diluent in a 5 cc. syringe equipped with a suitably sized blunt needle.

Temperature is another factor to be considered in the topical application of trypsin. Temperatures lower than that of the body diminish tryptic activity. In oral usage this thermal factor is near the optimum.

The proteolytic activity of the enzyme trypsin is expressed in Armour units or in milligrams of tryptic activity and not on a weight basis, since in weight measurements of enzymes there is no differentiation between biochemically active and inactive materials. To establish a base for experimentation with dosage, the recommended initial trypsin aerosol dosage of 125,000 Armour units dissolved in 3 cc. of Sorensen's phosphate buffer solution was topically applied in divided doses of approximately 41,000 units in 1 cc. of the diluent. Greater concentrations of crystalline trypsin up to 125,000 units were dissolved in 0.4 cc. of Sorensen's phosphate buffer solution and found to débride necrotic tissue more rapidly and completely.

Published reports[26, 27] have suggested that the method of choice in applying trypsin to a moist and accessible lesion is by sprinkling or blowing the dry powder on the diseased region after irrigation with Sorensen's phosphate buffer solution. This method was not found effective by the author because of the difficulty of application with powder and the dilution of the enzyme by the oral fluids.

It was determined that the most effective method of application was by saturating cotton packs of suitable size in the enzyme solution. These wet dressings were then placed at once on the affected region and allowed to remain for varying lengths of time ranging from five minutes to three hours. There was never more than one application per site per day. Wherever practical, control dressings of Sorensen's phosphate buffer solution alone were placed in as nearly similar lesions of the same patient as possible, and the results in both instances were noted. In some cases subgingival curettage was performed prior to the application of the trypsin or control dressings. Patients were seen daily for observation and reapplication of trypsin if this was desirable.

SELECTION OF CASES

Trypsin was used in a series of 32 cases by the method already described. Of

27. Morani, A. Trypsin therapy in the management of chronic surface ulcers. Plast. & Reconstruct. Surg. 11:372 May 1953.

these cases, 4 were gingivitis, 4 were Vincent's infection, 20 were periodontitis, and 4 were periodontosis. The cases were selected as typical examples of each of these entities in order that the action of trypsin might be studied under these various conditions. Except for the cases of Vincent's infection, the patients selected were of the upper socioeconomic classes, and the histories taken revealed that living habits and dietary habits were normal for these American economic groups. No restrictions were imposed on food selection by these patients. In all but 3 cases the medical history and the general medical condition were essentially negative: one patient, however, was diabetic, another was subclinically anemic, and a third had chronic osteomyelitis of the spine. There were 16 men and 16 women; the ages ranged from 26 to 79. The degree and effectiveness of oral hygiene varied extremely.

RESULTS

Gingivitis • The degree of response in cases of gingivitis varied. Gingivitis in which only simple inflammation was present did not show any clinical evidence of improvement; however, necrotic and suppurative inflammation of the gingiva was reduced by the action of proteolytic lysis. As soon as necrotic detritus was removed, the inflammatory signs diminished, and the soft tissue pocket depth was reduced.

Vincent's Infection • In cases of Vincent's infection the results of enzymatic lysis were excellent. Ulcerating interdental papillae and gingival margins with extensive necrosis and slough are conditions well suited to enzymatic treatment. Ulcerated tissue was rapidly removed on initial application of the enzyme to the affected area. Examination on the day following treatment revealed the reappearance of some necrosis, although it was confined to a much smaller region. With each successive treatment a diminished amount of cellular debris reappeared, and in all cases none was clinically observable within three to four days. Inflammation diminished in direct proportion to the reduction of necrotic tissue until the continuity of the epithelium was effected. Bacteriological studies made on all these patients showed sharp reduction in the number of *Borrelia vincenti* and fusobacterium.

In cases where the severity of infection necessitated immediate antibiotic therapy, approximately 100,000 units of penicillin G sodium crystals was dissolved with the crystalline trypsin in Sorensen's phosphate buffer solution. Wet dressings of the trypsin-penicillin combination were applied to the affected regions for a much longer period than would have been necessary for enzymatic action alone in order to allow the antibiotic time to be effective. In all cases, opposing quadrants were treated while opposite quadrants were used for controls. The quadrants treated with enzymes showed a decidedly accelerated rate of healing in contrast to the control regions where scaling or topical penicillin therapy alone was used. At the conclusion of treatment the quadrants receiving topical trypsin showed a diminished amount of soft tissue, particularly interproximally, regeneration of epithelium, reduced inflammation, reduced pocket depth and less noncellular debris.

It is interesting to note that patients' histories indicated a distinct difference in symptoms between treated and untreated regions. In the regions treated with trypsin less pain was experienced during the acute phase of the disease, less food accumulated during eating, and brushing was less painful.

Periodontitis • The immediate results of trypsin therapy in cases of periodontitis were gratifying: all necrotic tissue was removed, inflammation was decreased, purpuric areas indicating vascular

strangulation disappeared. Severe periodontal pockets in which wet dressings of trypsin were applied showed a decided difference from the nearly identical control pockets where only Sorensen's phosphate buffer solution was used. No change was noted in the control regions. In the pockets treated with trypsin, the pocket was exposed and visible in its entire extent. The soft tissue portion of the pocket was denuded of cellular debris and had a pink granular base. The cementum surface of the root was clean, and minute calculus deposits were clearly visible. This condition was of definite aid in completing the detailed scaling.

In cases of periodontitis in which necrotic slough of the interdental papillae was clearly evident, the enzymatic action of trypsin was obvious. After the topical application of wet dressings of trypsin, the necrotic slough had disappeared; and a thin, clear fluid was visible. The tissue was clean, having a base of epithelium denuded of the outer squamous cell layer. The edema was greatly reduced and the crest of the interdental papillae decreased in height. Subsequent daily observations and treatment revealed a decreased amount of necrosis reappearing on these open areas and diminished signs of inflammation. The reformation of healthy epithelial tissue was evident. After removal of gross etiologic factors such as calculus, it seemed apparent that healing took place, which was more rapid and complete than would have been expected by the conventional methods of treatment only.

In the case of one patient with acute severe periodontitis, heavy calculus deposits and poor oral hygiene, no conventional local treatment or hygiene instructions were given. Selected regions with deep pockets and severe inflammation, particularly noticeable in the interproximal embrasures, were treated with trypsin wet dressings; and control regions of similar kind and degree of disease in the adjacent quadrant were treated with packs of Sorensen's phosphate buffer solution only. All the cotton dressings were allowed to remain in place for three hours on each application. Treatments were given once daily for five days. At the end of this time in spite of heavy calculus deposits, a distinct improvement was noted in the regions where trypsin had been used, whereas those regions which had been selected as controls, where only the diluent had been used, showed little or no improvement. The inflammation in the regions treated with trypsin diminished, edema was greatly reduced, pocket depth decreased, and mobility of the teeth lessened. The treated tissue was in decided contrast to the untreated tissue, having a more healthy appearance and normal tone. In the treated regions the mechanical removal of calculus deposits by curettage resulted in complete healing, whereas the control quadrants did not respond as effectively and inflammatory signs remained.

Periodontosis • Tryptic débridement was employed in cases of periodontosis where slough and purulence were extensive and in one case where inflammation was not a severe secondary factor. Where extensive necrosis existed, the enzymatic action was immediate, and the tissues were cleansed rapidly and effectively. This treatment used in conjunction with the removal of mechanical irritants resulted in a decided decrease in the inflammatory process, although enzymatic débridement has no effect on the primary degenerative etiology of periodontosis.

In the case of periodontosis where there was but little evidence of severe inflammation, the action of trypsin did not appear to be effective in reducing pocket depth, although it cleansed the affected areas to some degree.

Additional Uses • Trypsin provided a means of promoting accelerated tissue repair after the use of escharotics which were employed for reduction of pocket

depth by chemical removal of the superfluous epithelium. In these instances trypsin was applied immediately after the caustic treatment, and it effectively removed the eschar. Bleeding followed removal of the trypsin packs, and a fresh, firm clot formation was observed over the denuded areas. Regeneration of epithelium under these conditions appeared to be more rapid than when the slough was allowed to remain untreated.

After a gingivectomy was performed, zinc oxide dressings were used. On removal of these dressings trypsin was applied to digest whatever resultant slough appeared. The enzyme, when applied in the form of wet dressings, cleansed these areas completely within ten minutes. Healing was rapid and uneventful, and no hyperplastic tissue formed.

ADDITIONAL OBSERVATIONS

The enzymatic action of trypsin on dental carious lesions was carefully observed, and clinically no change was discernible. Great care was necessary in the removal of trypsin wet dressings to minimize bleeding. It was observed that less time was required for clot formation to take place in the regions where trypsin had been used than in those regions which had not been treated with the enzyme. As was expected, trypsin had no action on either salivary or serumal calculus.

Clinical observations of some cases treated with trypsin showed partial removal of plaques from the tooth surfaces. Preliminary studies *in vitro* have not shown complete digestion of fresh materia alba scrapings. Further investigation of this subject is being made.

In no case was any pain experienced during or after application of the enzyme. No untoward postoperative results were noted with the exception of burning of the lips and tongue reported in several instances. The burning always occurred shortly after treatment, and was intensified by smoking or by eating very warm or highly seasoned foods. It is stated[28] that the occasional burning of the mouth noted following trypsin aerosolization for the treatment of respiratory diseases associated with hypersecretion can be decreased by spraying or rinsing the mouth with a small amount of tap water. Afterwards the patient should take several swallows of water to remove any remaining large droplets of trypsin.

Locally there were no retrograde changes of the tissues to which trypsin was applied, and no appreciable untoward results were noted. No systemic manifestations were observed. According to observations made, débridement was clinically complete within ten to twenty minutes. As healing progressed under tryptic treatment, the mobility of teeth with severe periodontal involvement decreased.

COMMENT

After the first application of trypsin to regions with cellular debris, the slough was removed. Examination the following day, however, revealed the reappearance of necrotic tissue although in lesser amount. Each day thereafter observation before treatment revealed diminished amounts of cellular debris and inflammatory signs until the lesions were free of necrotic detritus and healthy epithelium was regenerated. The cause for partial recurrence of necrosis in the treated lesions during enzymatic therapy may be attributed to several factors: (1) the large amount of bacteria in the oral cavity which causes the denuded surface of the lesion to become reinfected, (2) the continuance of the etiologic factors which promoted the lesion initially, and (3) the lack of complete removal of all irritants.

Débridement by enzymatic action is absolutely selective. The enzyme discriminates between living and dead cells

28. Roth, C. Personal communication with medical department, Armour Laboratories, Chicago.

so that wherever necrotic cells exist they are digested and no living tissue is altered.

The reduction of inflammation and promotion of tissue repair of infected oral tissues treated with trypsin may be partially explained on a bacteriologic basis. The extent and nature of the bacteria of the oral cavity and the anatomy of the mouth, which is physically conducive to bacterial growth, are related to periodontal disease. Regions which are of extremely difficult access and thus afford protection to and enhance the growth of bacterial colonies may be reached effectively by trypsin. The slough and debris which provide a medium for bacterial growth can be digested by enzymatic action. As previously pointed out in this study, the presence of trypsin is not conducive to the growth of some bacteria, while others are so altered that environmental changes are not well tolerated. With the reduction of bacteria, one of the contributing etiologic factors of periodontal disease is removed.

SUMMARY AND CONCLUSIONS

1. Enzymatic débridement with trypsin as an adjunct in the therapy of periodontal disease was employed in 32 clinical cases. The cases included 4 of gingivitis, 4 of Vincent's infection, 20 of periodontitis and 4 of periodontosis.

2. The method found most satisfactory was to apply the trypsin with saturated cotton dressings. Of the dosages tried, a concentration of 125,000 Armour units of crystalline trypsin in 0.4 cc. of Sorensen's phosphate buffer solution was the most effective.

3. The removal of slough and necrotic debris was an aid in the promotion of normal physiology of periodontal tissues.

4. Débridement was complete within ten to twenty minutes.

5. Inflammation was reduced by tryptic action, and the rate of tissue repair was accelerated.

6. Dental structures were unaltered by trypsin, and no systemic or undesirable local effects of any consequence were observed.

7. Trypsin had no action on dental caries, and calculus deposits were unaffected.

8. Trypsin did not reduce the depth of periodontal pockets unless the soft tissue portion of the pocket was necrotic.

9. Used according to the methods described, trypsin affords, to a much greater extent than heretofore possible, a means of supplementing the removal of debris associated with infected periodontal lesions.

450 Sutter Street

Service • The writer does the most who gives his readers the most knowledge, and takes from him the least time. *Sidney Smith.*

A transverse testing machine for denture resins

W. T. Sweeney, A.B.; Harold J. Caul,† B.S., and Willy Gneug,‡*
Washington, D. C.

Nearly all the denture base resins used by the dental profession in this country are evaluated on the basis of transverse tests.[1] The strength and deflection of these resins vary with temperature, rate of loading, moisture content and testing environment: air or water.[2,3] It is necessary, therefore, in making such tests to have an instrument which will permit control of these factors.

It is the purpose of this paper to describe an instrument which was recently designed and built at the National Bureau of Standards for this purpose. The new instrument is so constructed that a uniform rate of loading and precise alignment of the specimen can be obtained and the test can be performed in air or water under controlled temperature conditions.[4]

DESCRIPTION OF INSTRUMENT

The instrument, which is shown in the lower part of the illustration, is constructed of rust-resistant metals and has a base of 9 by 9 inches and an over-all height of 17 inches. The design provides for the application of a load in 500 Gm. increments of lead shot from the 24 cells of drum, A. The load increment is gradually and uniformly delivered over a period of 30 ± 5 seconds. The operator positions the ring, D, to which the lift, E, is attached in order to open each cell to deliver the load increment. The ring, D, is held in the same relative position for each cell by a spring finger which fits in the grooves on the ring. Successive units of 500 Gm. can be applied as desired. The shot rolls down an inclined plane to load symmetrically the pan or holder over the piston, C, through which the load is applied to the specimen, B.

The balancing weight, F, can be adjusted so that the total weight of the shot pan, dial pressure and piston is counterbalanced and deflections of the specimen from initial "no load" can be read.

The resin specimen, B, 10.00 ± 0.03 by 2.50 ± 0.03 mm. and approximately 65 mm. long, is placed over a 50 mm. span of the specimen holder, G. The bearing surfaces which contact the specimen are 3.2 mm. in diameter. The specimen holder is positioned by pins in the base so that the load is applied at the middle of the span.

The sensitive dial gauge, H, has a 25 mm. travel and is accurate to 0.01 mm.

*Chief, Dental Research Section, National Bureau of Standards.

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‡Instrument maker, National Bureau of Standards.

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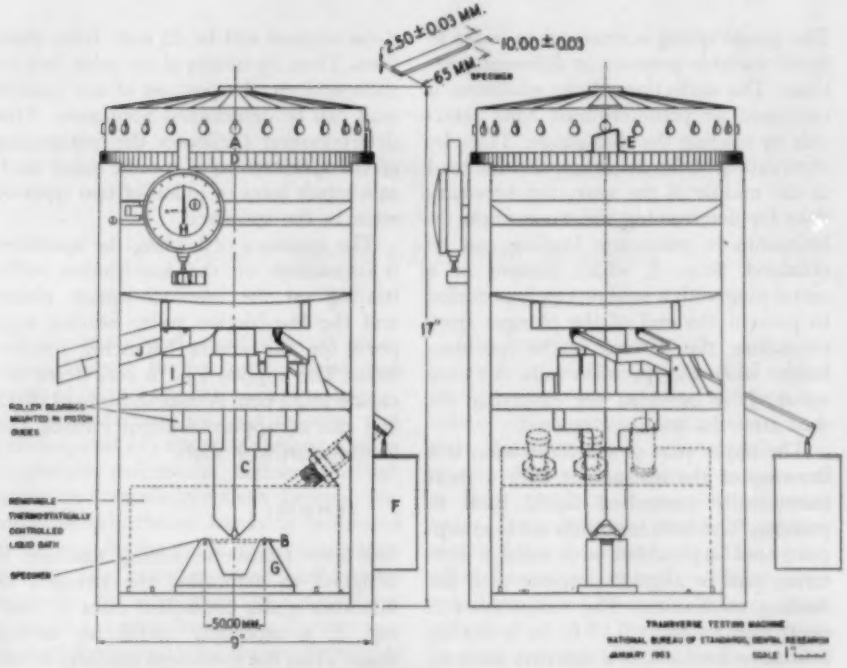
4. Detailed drawings of this instrument are available and can be obtained from the Dental Research Section, National Bureau of Standards, Washington 25, D. C.



Transverse testing machine

The gauge spring is removed in order to avoid variable pressure at different positions. The deflection of the specimen is measured at predetermined time intervals by reading the dial gauge. Thus, by observation of the deflection and the load at the middle of the span, the necessary data for determining the stress-strain relationship in transverse loading can be obtained. Stop, I, which consists of a metal plug with a rubber top, is provided to prevent the end of the plunger from contacting the bottom of the specimen holder when the specimen fails. A closed spout, J, is provided for emptying the shot after the test is completed.

The upper part of the illustration is a drawing of the instrument with a thermostatically controlled liquid bath in position. The bath fits inside the base supports and is provided with suitable centering pins to align it properly with the loading mechanism. The temperature is controlled to about 0.1° C. by a flexible resistance heater and a mercury thermostat. This control makes it possible to determine the transverse strength of the resin at any desired temperature in water or other liquids. For the most precise control of specimen temperatures in liquids, it would probably be desirable to insert a section of heat-insulating material in the plunger to reduce conduction from or to the specimen at the point of contact with the plunger.

The instrument is designed so that the load is applied through the square piston normal to the long axis of the specimen and at the midpoint of the span. Lines have been scribed on the specimen holder in such a position that the maximum stress applied will be 25 mm. from these lines. Thus, by means of an index line on the specimen, the position of the applied load can be determined accurately. This determination facilitates the positioning of the specimen at a specific point such as a repair joint or union of two types of resin in the specimen.

The accuracy of loading the specimen is dependent on the low-friction roller bearing on the one-inch-square piston and the low-friction roller bearing supports for the counterbalancing mechanism. The applied load is considered accurate to 25 Gm. A maximum load of 12 Kg. can be applied without refilling the loading pan with shot.

SUMMARY

The new transverse testing machine is designed to determine the strength of materials under controlled rates of loading. It is especially useful for testing resins when the specimens conform to the standard specimen (2.5 by 10.0 by 65 mm.) required by the American Dental Association and federal specifications for denture base resins.

The gravity feed of lead shot provides a more nearly constant rate of loading than manual loading methods.

The strength of the resin can be determined in air or in a thermostatically controlled liquid bath.

The instrument provides for accurate positioning of the specimen and load.

The automatic loading and ease of positioning of the specimen make it possible for one operator to conduct transverse tests efficiently.

Judgment • Judgment is a great asset; it makes the diagnostician and the surgeon both supermen. *C. H. Mayo, "Renal and Ureteral Stone," International Journal of Medicine and Surgery 42:613, December, 1929.*

Periodontal disease in the Syrian hamster

David F. Mitchell, D.D.S., Ph.D., Minneapolis

In the study and treatment of periodontal disease in the human being two types of factors are of major importance: (1) local factors, such as calculus and trauma, and (2) systemic factors, such as nutritional deficiencies, endocrine imbalances and certain infectious diseases. The study of this disease has been facilitated in the past by the use of dogs, guinea pigs, ferrets, rats, mice, monkeys and ground squirrels. No large group of any of these animals has been shown to suffer destruction of the periodontal tissues, detectable *in vivo*, after relatively brief periods of exposure to a simple, single factor such as a soft diet. Furthermore, no simple method of measuring amounts of destruction in such animals has been devised. As a result, studies of this disease have been limited to histologic sections from a few representative animals, or they have been dependent on the preparation of tremendous numbers of serial sections from all animals in a group, involving prohibitive amounts of time.

In order to provide a "local factor" in rats to superimpose on systemic conditions, rather difficult technics have been employed such as the forced interdental impaction of amalgam[1] or the tying of fine wires around the cervix of a tooth.[2] In these studies, it was thought that the use of such local irritants would highlight the response, or lack of it, of the periodontal tissues of an animal subjected to systemic influences and that the results would help to prove or disprove the importance of induced systemic factors.

The hamster is especially useful for experiments of this type because a local factor, in the form of gingival debris, develops quickly after a simple dietary regimen. Furthermore, it is inexpensive and readily available, and can be maintained in large numbers in a relatively small space. The gestation period is approximately 15 days—shorter than that of any other laboratory animal—with an average litter of six or more. It is a monophyodont animal; the three molar teeth in each quadrant of the jaws resemble human molars in many respects (Fig. 1).

The purposes of this paper are (1) to present a review of the literature concerned with studies of the periodontium of the hamster, (2) to record a refined technic for the study of induced periodontal disease and (3) to arrive at an evaluation of this animal as a research tool for the study of periodontal disease.

REVIEW OF LITERATURE

The hamster was first used as an experimental animal in dental caries research

Presented at the annual meeting of the American Academy of Oral Pathology, Chicago, February 7, 1954.

Associate professor of dentistry, School of Dentistry, University of Minnesota.

This study was supported in part by a research grant from the National Institute for Dental Research of the National Institutes of Health, Public Health Service, and in part by a grant from the graduate school, University of Minnesota.

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2. Barnfield, William F. Induced alveolar bone destruction and endocrinal disturbances in the rat. (Abst.) J. D. Res. 25:173 June 1946.

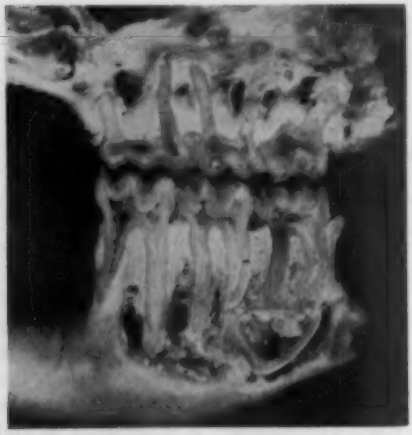

Fig. 1 • Buccal bone of maxilla and mandible and portions of molars ground away to reveal anatomy of teeth and periodontium of young adult hamster

in 1942.[3] Periodontal lesions in this animal were first reported in 1946.[4] In 1948, the writer[5] reported on the gross and microscopic characteristics of the normal periodontium of the hamster and confirmed the observation that a soft, fine-particle, high carbohydrate diet—for example, one composed of sucrose, 15 per cent; corn starch, 20 per cent; whole powdered milk, 30 per cent; whole wheat flour, 30 per cent; alfalfa, 4 per cent; and sodium chloride, 1 per cent—seemed to promote the accumulation of a soft, white subgingival debris, visible to the eye. Periodontal destruction occurred in association with this soft diet; the destruction differed in type when the animals were maintained on a coarse laboratory chow diet.

King and Gimson[6] studied the effects of a moistened soft diet, consisting largely of cereal and powdered milk, on the periodontium of hamsters and reported the presence of "food and other debris and light or dark brown calculus (tarter)" around the necks of the teeth, with resulting periodontal destruction. Avery and Hein[7] showed that the openings of the parotid glands are beneath a protective flap of tissue anterior and lateral to the maxillary first molar and that the submaxillary and sublingual ducts open beneath the tongue, lingual to the incisors. In later papers, King[8, 9] presented the microscopic findings in a study of the same animals and developed an idea concerning the progress of this form of periodontal disease: deposition of calculus on the cuticle of the molars, pocket formation, impaction of food and debris, further calculus deposition and calcification of subgingival debris, resulting in destruction of the periodontium and loosening of the teeth.

An attempt was made to test a systemic factor considered by some as causing a predisposition to periodontal disease.[10] This factor, hypothyroidism induced by the administration of propylthiouracil, was tested in a group of hamsters to determine whether or not the hypothyroidism resulted in increased periodontal disease. By the methods employed, no observable difference was found between the jaws of the experimental and control animals.

The role of another possible systemic factor—dietary calcium deficiency—was evaluated in a study of hamsters.[11] Although no significant conclusions were

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10. Mitchell, D. F. The effect of propylthiouracil on the periodontium of the hamster. J. D. Res. 29:386 June 1950.

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reached, an impression was gained that the animals on a high calcium diet had less periodontal destruction than did those on the medium and low calcium diets. The effect of food particle size on the periodontium was investigated[12] by feeding whole pellets (Purina Fox Checkers, Ralston Purina Co., St. Louis, Mo.) to the controls and the same food, ground to pass a no. 20 mesh screen, to the experimental group. The finely divided diet, in this instance, did not result in periodontal disease of any greater degree than did the whole pellets. Thus it appeared that fineness of diet per se is not responsible for this form of generalized periodontal destruction.

An experiment[13] was conducted to determine whether or not coprophagy might play a role in maintaining the normal periodontium, perhaps by supplying some nutritional factor, but it did not show such a relationship. The same study demonstrated that bedding material of wood shavings does not raise periodontal scores per se and that more uniform susceptibility to generalized periodontal destruction results from the carbohydrate diet than from a laboratory coarse chow diet. A scoring method was devised, which was based on macroscopic and microscopic evidence that periodontal tissue destruction is directly proportional to the amount of accumulated gingival debris.

In another study the method was simplified and shown to be definitive enough to detect differences between the groups tested.[14] Combinations of dibasic ammonium phosphate and urea, when fed with the diet and brushed on the teeth daily, were associated with lower periodontal destruction scores. No differences in the scores of animals fed 15, 30 and 45 per cent sucrose in the diet were apparent. Later, ingested dibasic sodium phosphate was shown to reduce periodontal scores equally as well as dibasic ammonium phosphate, whereas urea alone had little or no effect.[15] These results roughly paralleled the caries scores of the animals. These experiments revealed the need for further study of the relationship between caries and this form of periodontal disease.

Helman[16] demonstrated an increase in periodontal disease scores when several amino acids in hydrolysate form were added to the diet. The fact that the animals suffered an epizootic due to salmonella and that their number was considerably reduced prevented definite conclusions as to the significance and nature of this observation.

After autoclaving the jaws of six hamsters, King[17] collected "calculus-like" material from them. The dry weight was 10.7 mg. Calculated as calcium phosphate, the calcium content was reported as 52.4 per cent, indicating "a considerable degree of calcification of the material examined."

Rushton[18] has described the progression of the epithelial attachment along the root toward the apex of the hamster molar. He believes that the progress is associated with increasing age and only partly dependent on the presence of a bacterial plaque at the gingival margin. He has shown also that the administration of methyltestosterone retards this progress,[19] and he suggests that this effect is due to a depression of a function, or functions, of the anterior portion of the pituitary gland.

12. Mitchell, David F., and Shourie, Kanwar L. Preliminary investigation of the effect of food particle size on the periodontium of the hamster. (Abst.) J. D. Res. 27:764 Dec. 1948.

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PRODUCTION AND MEASUREMENT OF INDUCED PERIODONTAL DESTRUCTION

Care of Animals • To induce periodontal tissue destruction, it is recommended that the animals be maintained in cages with a floor of approximately ½ inch mesh wire screen in order to provide cleanliness without the necessity for bedding material, for example, wood shavings, which would become impacted in the periodontal region and complicate the histological technic and the interpretation. For young or old animals, a soft, fine, high carbohydrate diet, such as that already described, appears to be nutritionally adequate as measured by increase in body weight and after approximately 100 days will result in gingival accumulations and periodontal destruction.

Nature of Destruction • The subgingival accumulations appear as a white line around the teeth. Macroscopically this material is white, soft and granular. Its presence may be related to: (1) pressure impaction of fine food particles into the sulcus, (2) the tenacious character of the moistened diet, (3) the prior presence of microscopic amounts of salivary calculus (not yet demonstrated in the University of Minnesota laboratory).

Inflammation of the gingival tissues is not a prominent feature. Apical progress of the epithelial attachment, resorption of the crests of alveolar bone, development of deep, "rounded" gingival pockets, full of basophilic material, and ultimate loosening of the teeth are characteristic.

Figure 2, above left, is an occlusal view of the maxilla of a one year old animal which had been fed the soft diet for 150 days before it was killed. The gingival accumulations are extensive. To reveal the extent of the gingival damage and to illustrate the noncalcified nature of this debris, the jaw was cleansed with a fine stream of water and then with a jet of air. Figure 2, above right, shows that most of the debris has been washed away and deep gingival sulci have appeared.

The same specimen was then fixed in Formalin, decalcified with a chelating agent and formic acid, embedded in paraffin, cut and stained with hematoxylin and eosin. Figure 2, center, shows nearly empty gingival crevices and extremely reduced alveolar bone.

Figure 2, below, is a higher magnification of the palatogingival area on the left of Figure 2, center. In the upper left of Figure 2, below, basophilic debris is visible just above the epithelial attachment on the cementum of the root. The pocket is lined with squamous epithelium. The amount of inflammation is not noteworthy. The crest of the alveolar process is now blunt and notched by resorption. Many osteoblasts are concentrated on the surface and have formed a pale layer of osteoid tissue, presumably in their effort to rebuild the lost bone. If the basophilic material remaining on the root surface is calculus, it certainly represents a small proportion of the subgingival matter and would not affect the periodontal score recorded at magnifications less than 30×.

Scoring • In the course of the early studies, it was noted that the detection of differences between experimental and control groups was highly subjective and difficult if the investigator simply viewed the fresh jaws under the dissecting microscope, arrived at subjective interpretations as to the degree of periodontal destruction, and studied microscopic sections of only a few representative jaws. This observation led to the development of a simple scoring method to be used on all the animals of a given study.

The presence of gingival debris may be assessed at any time by observation of the upper jaws of the living animal. For accurate scoring, the animals are decapitated, and the jaws are spread wide apart and observed under a dissecting microscope at magnifications from 6 to 30×. It is convenient to use a mimeographed

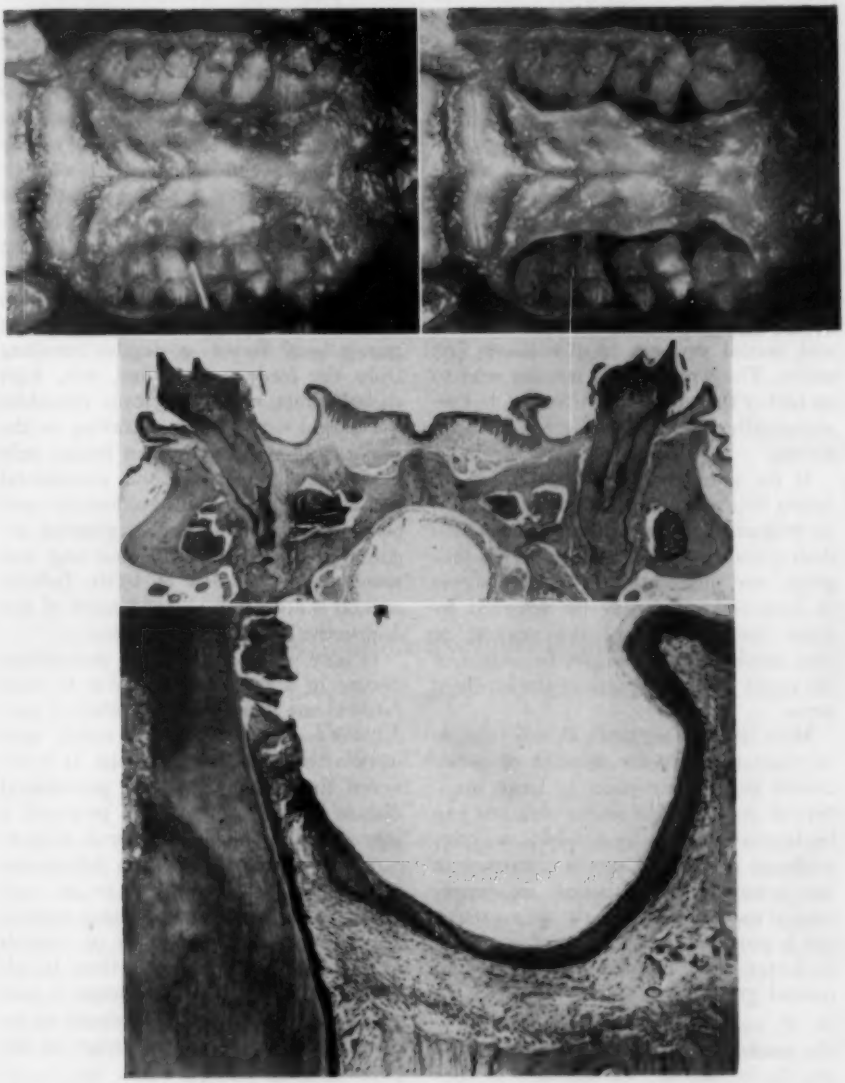

Fig. 2 • Above left: Maxilla of one year old hamster, fed a soft diet for 150 days. Debris can be seen near palatal gingivae; there is an impacted particle of wood shaving between upper right first and second molars. Above right: Depth of pockets and extent of root exposure visible after debris was flushed away. Center: Frontal section, showing reduced height of alveolar bone, with peaks flattened to plateaus, especially beneath palatal pockets. Epithelial attachment has moved apically on all surfaces. Bits of debris are still present on some surfaces of crowns. Below: Higher magnification of palatogingival area on left of specimen, center of figure

diagram of the occlusal views of the upper and lower molars *in situ*. The presence of gingival debris is recorded simply by a line on the diagram where debris is seen next to any one tooth surface. The total score possible for a single animal thus would be 32, indicating debris in the gingival sulci of 32 surfaces: the buccal and lingual surfaces of the 12 molars, plus the mesial surfaces of the 4 first molars and the distal surfaces of the 4 third molars. The interproximal spaces are not counted. The most commonly affected gingival sulci are on the lingual and mesial surfaces of the lower first molar. The scores of the females tend to be higher than those of the males, but no statistically significant difference has been shown.

If for some reason there is so much debris that too many scores are 32, then an estimation of the total area of gingival destruction may be drawn in on the diagram; and differentiation between scores of various groups may be achieved by some determination of the amount of area involved, for example, by weight of the paper of the diagrams of the involved areas.

With this scoring method, it is possible to evaluate easily the amount of periodontal tissue destruction in large numbers of animals. The scores obtained can be treated statistically to yield objective evidence of the differences occurring in the amount of destruction in experimental and control animals; thus a measure is provided of the effect of a systemic factor superimposed on the experimental group.

DISCUSSION

In regard to the differences in the results of this study and those of King,[17] it should be pointed out that it has not been possible to show that calculus develops in hamsters. When the debris in the gingival crevices was analyzed in the University of Minnesota laboratory, the dry weight of the material collected from several animals immediately after they were killed was 6.4 mg., and the ashed weight was about 12 per cent of this amount. The percentage of calcium and phosphorus in this material was minute. Therefore, this material had no resemblance to the chemical constitution of calculus. Furthermore, the concentration of the material does not appear to be related necessarily to the position of the orifices of the salivary gland ducts.

The form of periodontal destruction which occurred appears to be due to a purely local factor—a deposit resulting from the feeding of a fine, soft, high carbohydrate diet. This form resembles the periodontal disease occurring in the majority of cases in human beings only in that similar tissues—bone, periodontal membrane, crevicular epithelium and cementum—are affected by gingival accumulations, resulting in loosening and sometimes exfoliation of teeth. Inflammation is not a prominent feature of this destructive process in the hamster.

It may well be that most periodontal disease in human beings is due to local factors, but there is a possibility of predisposing systemic factors, which may work alone or in combinations. It is believed that these studies of periodontal disease in the hamster have prepared a way to test a variety of systemic factors, such as mineral and vitamin deficiencies and endocrine imbalances, in an easy manner through a tested scoring method applicable to large numbers of animals in relatively short periods of time. In addition, the scoring method makes it possible to test any factor advocated as increasing resistance of any portion of the periodontium to disease.

It may no longer be necessary to rely for conclusive results on representative microscopic material from only a few selected animals, with unavoidable subjective interpretation; nor should it be necessary to rely solely on the interpretation of tremendous numbers of serial

sections of all animals, a procedure which often involves a prohibitive amount of time. Neither should it be necessary, in order to evaluate a systemic factor in this animal, to superimpose some laborious contrivance to act as a predisposing local factor.

SUMMARY AND CONCLUSIONS

From studies of the periodontium of the hamster, it appears that the hamster fed a soft, fine-particle, high carbohydrate diet almost inevitably suffers periodontal destruction associated with gingival debris. The destruction occurs in otherwise healthy animals and appears to be of purely local origin. The amount of destruction may be measured by a simple scoring method. The resulting objective data may be statistically treated to show differences in susceptibility to this form of destruction of the periodontium in experimental and control groups of animals.

This method of scoring and evaluating data, it is believed, will make it possible to evaluate in the hamster numerous suspected but unproved systemic factors that may or may not contribute to the etiology of periodontal disease.

Brantford, Ontario, fluoridation study

William L. Hutton, M.D.; Bradley W. Linscott,† D.D.S., and Donald B. Williams,‡ Brantford, Ontario, Canada*

Brantford, Ontario, is a small city with a population of 36,000. For over a generation, the appalling amount of dental caries among school children has been a major concern of the local health authorities.

In 1944 the City Council, on the recommendation of the local Board of Health, approved the fluoridation of the municipal water supply. Because of a delay in obtaining the necessary equipment, fluoridation did not begin until June 20, 1945.

In the spring of 1944 and again in the spring of 1945, the school dental officer and his assistant conducted the prefluoridation dental surveys. The first postfluoridation survey was conducted in the late fall of 1946, and such a survey has been repeated each succeeding fall. All examinations were made with mouth mirror and sharp explorer, and a modern focusing light and a children's dental chair were used.

A Wallace and Tiernan type N. A. Volumetric Dry Feeder is used to add sodium fluoride to the Brantford city water. The machine discharges directly to the clear well, after filtration, where great turbulence readily disperses the

*Director, Brant County Health Unit.
†School dental officer.
‡Chemist, Brantford Water Works.

Table • Dental caries experience (def and DMF) observed in Brantford, Ont., Canada, children of continuous residence prior to and eight years after fluoridation

Age	1944-45 prefluoridation examinations					1953 examinations—8 years of fluoridation					Percentage reduction of prevalence 1944-1953	
	No. children examined		No. teeth def	No. teeth DMF	def per child	DMF per child	No. children examined		No. teeth def	No. teeth DMF	def per child	DMF per child	def	DMF
5	318		1,793		5.64		420		969		2.31		59.0	
6	556		3,692	223	6.64	.40	581		1,936	90	3.33	.15	49.9	62.5
7	616	3,881	4,177	1,023	6.78	1.66	461	2,770	1,691	222	3.67	.48	45.9	71.1
8	614		3,931	1,499	6.40	2.44	338		1,282	391	3.79	1.16	40.8	52.5
9	608		3,403	1,936	5.60	3.18	304		1,283	577	4.22	1.90	24.6	40.3
10	565		2,119	2,148	3.75	3.80	350		997	721	2.85	2.06	24.0	45.8
11	604		1,054	2,829	1.75	4.68	316		600	909	1.90	2.88	+8.6	38.5
12	658			4,151		6.31	270			1,018		3.77		40.3
13	531			4,132		7.78	237			1,160		4.89		37.1
14	307			2,639		8.60	82			485		5.91		31.3
15 and 16	105			1,044		9.94	26			173		6.65		33.1
Total	5,482		20,169	21,624	5.20	4.19	3,385		8,758	5,746	3.16	1.94	39.2*	53.7†

*For 3,881 children examined in 1944-1945 and 2,770 children examined in 1953, aged 5 through 11.
†For 5,164 children examined in 1944-1945 and 2,965 children examined in 1953, aged 6 through 16.

fluoride, and long contact in a baffled reservoir assures uniform solution.

The fluoride content of the finished water is maintained at 1 ppm. This requires the addition of some 24 pounds of sodium fluoride per million imperial gallons. Samples are analyzed according to "Standard Methods."[1] To assure proper control, samples are dechlorinated according to the method reported by Taras and co-workers.[2]

The experience of more than eight years has shown that fluoridation is a simple water works procedure.

The accompanying table summarizes the changes in dental caries experience 1944-1953. It is the record of purely local studies. These studies have no connection with the independent comparative studies, beginning in 1948, of dental conditions in Stratford, Sarnia and Brantford, conducted by Dr. H. K. Brown on behalf of the Canadian Department of National Health and Welfare.

1. Standard methods for the analysis of water and sewage, ed. 9, New York, American Public Health Association, 1946.

2. Taras, M. J.; Cisco, H. D., and Garnell, M. Interferences in alizarin method of fluoride determination. J. Am. Water Works A. 42:583 June 1950.

Words as Instruments • The use of language can become an instrument of health and joy just as its abuse can act as a vehicle of discouragement and misery. We can strike with a word sometimes more effectively than with the fist; by words we can help and hurt, inspire and dishearten, give value to a matter or throw it into oblivion. *William G. Niederland, Man-Made Plague: A Primer on Neurosis.*

Two year clinical study of caries control with high-urea ammoniated dentifrice

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For any attempt at caries control to be successful, it must be acceptable to the individual. Dietary control of carbohydrate, for example, although an unquestionably valuable adjunct, is mostly of academic interest, since it is most difficult to get the cooperation even of the parents for such a program. Therefore, when the ammoniated dentifrices were first reported, they seemed to provide two of the essentials for an effective means of caries control: adaptability and acceptability by the patient. Fosdick[1] had shown that good oral hygiene in itself would reduce caries experience. Therefore, if a therapeutic agent could be incorporated into the dentifrice to provide even greater protection, the dentifrice would be a valuable adjunct in caries prophylaxis.

There were many reasons for assuming that the ammoniated dentifrices would fulfill their intended role. Urea had been shown to be a bacteria inhibitor[2] which therefore might offer some control of the oral bacterial population. Urea also had been shown to be a protein denaturant[3] and solubilizer, which might reduce the size and number of dental plaques. Furthermore, both urea and diammonium phosphate are potential liberators of ammonia, which would serve to neutralize any acid produced from carbohydrate. Finally, both urea and diammonium phosphate are completely nontoxic and therefore lend themselves to safe clinical testing.

On the assumption of these properties of urea and diammonium phosphate, it was decided that a dentifrice incorporating these compounds was worthy of extended clinical trial. A dentifrice paste containing 13 per cent urea and 3 per cent diammonium phosphate was selected, since it appeared that if the assumptions previously made were correct, then the higher concentrations should be more desirable.

Since the start of this project, a number of papers have appeared on the clinical evaluation of ammoniated dentifrices. Kerr and Kesel,[4] reporting on a low-urea ammoniated dentifrice, found a difference of questionable significance between their control and test groups.

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Both the control dentifrice and the test dentifrice used in this study were supplied by Amm-i-dent, Inc., Jersey City, N. J. The toothbrushes were supplied by Py-co-pay, Inc., Jersey City, N. J.

1. Fosdick, L. S. Reduction in the incidence of dental caries. I. Immediate toothbrushing with a neutral dentifrice. J.A.D.A. 40:133 Feb. 1950.

2. Symmers, W. St. C., and Kirk, T. S. Urea as a bactericide, and its application in the treatment of wounds. Lancet 2:1237 Dec. 4, 1915.

3. Holder, H. G., and MacKay, E. M. The use of urea in the treatment of infected wounds. J.A.M.A. 108:1167 April 3, 1937.

4. Kerr, D. W., and Kesel, R. G. Two-year caries control study utilizing oral hygiene and an ammoniated dentifrice. J.A.D.A. 42:180 Feb. 1951.

Davies and King,[5] and Dirks, Winkler and Van Aken[6] also have reported the lack of clear-cut, statistically significant results in caries reduction by means of low-urea ammoniated dentifrices.

Another type of ammoniated dentifrice, containing urea plus an added source of urease, was the subject of a recent report by Hawes and Bibby.[7] They found no significant difference in the caries experience of children using the control dentifrice and the experience of those using the test dentifrice.

The clinical reports thus far on results of the high-urea ammoniated dentifrice either have related to too few patients—for instance, the reports of Henschel and Lieber,[8] and of Gale[9]—or have been of a preliminary nature, as the report of Lefkowitz and Vente.[10]

THE PROJECT

In the regular dental program of the Philadelphia school system great emphasis is placed on the practice of good oral hygiene. All the pupils in the school system have been given adequate instruction along these lines. Each student's method of cleansing the teeth and massaging the gingiva is checked biannually at each examination. It has been shown previously in a study of gingivitis in children[11] that the incidence of gingivitis was lower in Philadelphia than in Chicago; this difference was attributed to the oral hygiene program.

Because of this background, the mechanics of establishing the project were relatively simple. The plan was presented to the Board of Superintendents and received its approval. The principals in the schools where this project was to continue for a two year period cooperated to the fullest extent. The parents were informed of the purpose and duration of the experiment, and their consent was obtained before any of the pupils were included in the project. Three grade schools were selected so that different racial and economic levels would be represented in both the experimental and the control groups. The pupils were selected from the lowest grades to obtain a group that would be in school during the length of the project.

Special industrial washstands were installed (illustration) so that large groups could brush their teeth simultaneously under supervision. Plastic containers, holding a brush and tube of dentifrice, were kept in nearby cabinets. The name of the pupil was printed on adhesive tape on the container assigned to him.

This project was unique in that the actual brushing, although carried out in the school building, was not done in a classroom but at washstands under adequate supervision. The pupils brushed their teeth at the washstands twice a day, when they arrived in school at 9 A.M. and after the lunch period at 1:30 P.M. Daily records were kept of attendance. In addition to the brush and dentifrice used in school, each pupil was given a brush and tube of dentifrice for home use and an adequate supply of brushes and dentifrice for the summer vacation period.

This experiment was a critical test of the dentifrice formula because the pupils attending the schools were from socioeconomic levels varying from the lowest to the average level.

Those children who expressed a willingness to participate and who received

5. Davies, G. N., and King, R. M. The effectiveness of an ammonium ion toothpowder in the control of dental caries. J. D. Res. 30:645 Oct. 1951.

6. Dirks, O. B.; Winkler, K. C., and Van Aken, J. A reproducible method for caries evaluation. III. Tests in a therapeutic experiment with an ammoniated dentifrice. J. D. Res. 32:18 Feb. 1953.

7. Hawes, R. R., and Bibby, B. G. Evaluation of a dentifrice containing carbamide and urease. J.A.D.A. 46:280 March 1953.

8. Henschel, C. J., and Lieber, Leon. High-urea ammoniated dentifrice: caries reduction through four years' home use. Oral Surg., Oral Med. & Oral Path. 5:155 Feb. 1952.

9. Gale, J. A. A controlled experiment on preschool children with an ammoniated dentifrice. D. Record 71:15 Jan. 1951.

10. Lefkowitz, William, and Vente, V. A. A preliminary clinical report on caries control with a high urea ammoniated dentifrice. Oral Surg., Oral Med. & Oral Path. 4:1576 Dec. 1951.

11. Massler, Maury; Cohen, Abram, and Schour, Isaac. Epidemiology of gingivitis in children. J.A.D.A. 45:319 Sept. 1952.

parental consent took part in the project. They were assigned to either group on the basis of school class distribution before any examinations were made. An attempt was made to have approximately the same proportion of test and control children in each school room. In the original group there were 449 pupils. The average age at the start of the experiment was approximately 11 years; 211 boys and 238 girls participated.

EXPERIMENTAL PROCEDURE

At the start of the project each pupil was given a complete clinical examination including bitewing roentgenograms. All examinations were given by one of the authors (A.D.), and thus any question of variation among examiners in the clinical examination was eliminated. Similar examinations were repeated at six month intervals during the two year period. In the clinical examination any break in the tooth enamel large enough to catch an explorer was recorded as a carious lesion. The hygienic condition of the mouth was recorded at each examination as clean, fair or dirty. This study included only permanent teeth in the final evaluation.

Although the study began with 449 pupils, there was a loss of 143 pupils because of transfers from one school to another. At the completion of the study there were 306 pupils, 169 in the test group and 137 in the control group. The age distribution within each group appears in Table 1.

Special washstand installed for experiment

At the end of one year only 297 children were included in the study, but at the end of two years the full group of 306 was used. Nine children were absent from the third examination so that there was no record for them at the end of one

year, but they were present for both subsequent examinations. The absence of children from the 6 month or 18 month examinations had no effect on the study as reported.

The dentifrices used in this study were of the same color, texture, flavor and abrasive and detergent nature. The only difference between the two dentifrices was that the control dentifrice was a plain cleansing paste and the test dentifrice contained 13 per cent urea and 3 per cent diammonium phosphate. The control dentifrice was composed of calcium phosphates, sorbitol, glycerin, carboxymethylcellulose, flavoring, artificial coloring, sodium lauryl sulfoacetate and water. The test dentifrice, containing 13 per cent urea and 3 per cent diammonium phosphate, had proportionate reductions of calcium phosphates and water.

Table 1 • Age distribution of children in experimental and control groups at end of study period

Age in years (nearest birthday)	Number of children	
	Experimental group	Control group
9	2	0
10	35	30
11	79	67
12	51	35
13	2	5
Total	169	137
Average age	11.10 years	11.11 years

The dentifrice pastes were packaged in plain white tubes numbered from 1 to 12. Five of the 12 contained control pastes and 7 the test dentifrices. The numbered dentifrices were assigned to the children before the dental examination and without reference to any specific characteristics of the child. The participating examiner did not know what the numbers referred to or how many different dentifrices were being tested.

RESULTS

At the beginning of the study a comparison of the number of noncarious permanent teeth of the experimental and control groups showed that the two groups were similar. Likewise the number of permanent teeth which erupted during the study period was similar for both groups; that is, the difference between the averages for each group was not statistically significant. The data gathered on the two groups (Table 2) likewise showed a comparability such that it could be assumed that the previous caries experience was similar in both groups and that the number of teeth continued to be essentially the same in both groups.

The data obtained after one and after two years of brushing with the experimental and control dentifrices are presented in Table 3. Comparison of means reveals that the difference at the end of one year between the average numbers

Table 2 • Similarity of control group and experimental group

	Group	No. children	Total teeth	Mean	Significance ratio
Total number of permanent teeth noncarious at start and erupting during study period	Experimental	169	3,020	17.87	1.01
	Control	137	2,529	18.46	
Permanent teeth erupting during study period	Experimental	169	1,226	7.25	0.11
	Control	137	974	7.11	

of new carious teeth for the two groups, 1.01 and 0.78, is not statistically significant; but the difference between the averages at the end of two years is significant. The probability is computed as 0.01, signifying that there was 1 chance in 100 that the differences could have occurred by chance. The incidence of caries in previously caries-free teeth during the first year was 22.9 per cent less in the group using the high-urea experimental dentifrice than in the group using the control dentifrice. After two years of study, this difference in caries incidence was 25.2 per cent, about the same order of magnitude as at the end of the first year.

When these data were analyzed on the basis of number of children with no new carious teeth, it was found that 55 of the 169 children in the experimental group, 32.5 per cent, had no new carious teeth during the two years of the study, compared with 33 of the 137 children, 24.1 per cent, in the control group. The relative difference between the two groups in the percentage of children with no new caries was 25.8 per cent.

Table 2 shows that the average number of initially noncarious teeth in the control group, 18.46, was greater than the average number in the experimental group, 17.87, although the difference between the two was statistically not significant. Although there were slightly more permanent teeth erupted during the study in the experimental group, 7.25, than in the control group, 7.11, there were nonetheless more teeth exposed to caries attack in the control group than in the experimental group. In order to "adjust" this difference, analysis of covariance was performed.[12]

The probability of equaling or exceeding an F value variance ratio of 6.30 at 1 and 303 degrees of freedom through chance factors alone is between 1 per cent and 2 per cent.[13] Thus, there is statistical significance also when the number of originally noncarious teeth in each group is taken into consideration.

DISCUSSION

In order to reduce the variability of the measurements, the comparisons in this study were made in terms of permanent teeth only, rather than in terms of deciduous teeth and tooth surfaces.

The analyses were performed in terms of averages so that the variations within each group could be appropriately assessed. This method is preferred to the "pooling" method, in which the over-all

Table 3 • Decrease in incidence of caries in permanent teeth, originally noncarious or unerupted at start of study

Time interval	Group	No. children	No. teeth becoming carious	Mean	% reduction in incidence of caries	Significance ratio	Children without new caries		
							no.	%	% increase
After one year	Experimental	166	130	0.78	22.9	1.63			
	Control	131	132	1.01					
After two years	Experimental	169	287	1.70	25.2	2.57	55	32.5	25.8
	Control	137	311	2.27			33	24.1	

12. Fertig, J. W., and Chilton, N. W. An appraisal of various methods employed to analyze the clinical effectiveness of caries-inhibitory agents. Am. J. Pub. Health 42:825 July 1952.

13. Chilton, N. W. Analysis in dental research. Washington, D. C., Office of Technical Services, U. S. Department of Commerce, 1953, p. 100-102, 204ff, 69ff, 84ff, 174.

attack rate is compared for each group.[12] Thus, according to the pooling method, in the experimental group 287 teeth became carious out of 3,020 originally noncarious teeth, while in the control group 311 teeth became carious out of 2,529 originally noncarious teeth. The standard significance test of differences between proportions[13] gives an inflated significance ratio of 3.3, as compared to a significance value of 2.57, calculated on the basis of individuals.

Since teeth vary with the individual in susceptibility to caries, it would appear more meaningful to relate changes in caries incidence to individuals rather than to populations of teeth.

In this experiment every effort was made to control the usual sources of error inherent in clinical research on dental caries. The starting groups were large enough so that even with the loss of some students, the final groups contained sufficient numbers for statistical evaluation. On the other hand, the groups were not so large that they militated against adequate supervision, careful control and examination by one examiner.

The experiment was, therefore, a fairly critical evaluation of reduction in caries incidence through the supervised use of a high-urea ammoniated dentifrice. The results indicate that the supervised use of the high-urea ammoniated dentifrice will reduce the number of permanent teeth with new carious lesions in children of school age by 25 per cent after two years as compared with the number after the supervised use of an ordinary cleansing dentifrice. The results indicate also that about 26 per cent more children will have no permanent teeth with new carious lesions after two years on a supervised program with a high-urea ammoniated dentifrice as compared with the number of children with such teeth after the supervised use of a nonammoniated dentifrice.

SUMMARY

The average number of teeth with new carious lesions in a group of 169 children on a supervised program in which a high-urea ammoniated dentifrice was used over a two year period was found to be 1.70 compared with an average of 2.27 permanent teeth with new carious lesions in 137 children who used a control dentifrice in a similar manner, a relative reduction of 25.2 per cent. The difference between the average numbers of permanent teeth with new carious lesions in the two groups is statistically significant.

Defense Against Political Panaceas • America is made up largely of average men who instinctively distrust the intellectual. This defense mechanism . . . is, in my opinion, and contrary to the current criticism of lack of finesse of the average American, the most precious asset for the preservation of our democracy. And as all panaceas such as communism, fascism, nazism and the rest of the "isms" which could radically change the tone of our middle ground democracy, must be hatched by thinkers or semi-thinkers, it is to be hoped that they will have rough going. *Joaquin Ortega, Rethinking Cervantes.*

Lack of effectiveness of chlorophyll ointment in the treatment of chronic diseases of oral mucous membranes

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Medications that contain chlorophyll have been reported in the literature as having deodorant, tissue-healing and tissue-stimulating properties, particularly in the treatment of chronic dermatologic lesions that are slow in healing. The present study was undertaken in order to evaluate the effectiveness of an ointment that contains chlorophyll in the treatment of some chronic oral mucous membrane diseases such as desquamative stomatitis and desquamative gingivitis; lesions characterized clinically by a combination of desquamation and hyperkeratosis, usually with ulceration; recurrent aphthous stomatitis; sore mouth caused by dentures; extensive idiopathic chronic oral ulcers; idiopathic orolingual paresthesia; ulcerations resulting from denture irritation, and other chronic oral mucous membrane diseases exclusive of gingivitis or periodontal disease.

METHODS

Seventy patients (22 men and 48 women), aged 20 to 76, were included in this study. Patients were divided into seven groups as follows:

Group 1 was composed of seven patients with chronic desquamative gingivitis or chronic desquamative stomatitis. Placebo medication was given for four weeks, after which an ointment containing chlorophyll was applied ten times a day to the affected parts for four weeks.

Group 2 was composed of nine patients who had lesions characterized clinically by a combination of desquamation and hyperkeratosis, usually with erosive ulceration. Placebo medication was first prescribed for four weeks, and this was followed by the administration of the ointment containing chlorophyll that was applied ten times a day for four weeks.

Group 3 was composed of 13 patients with sore mouths caused by dentures. Placebo medication was prescribed for two weeks, followed by the administration of the ointment containing chlorophyll which was applied to the under

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This study was supported in part by a grant-in-aid from the Rystan Company, Mount Vernon, New York. The ointment containing chlorophyll that was used in this study is known commercially as Chloresium ointment. The ointment containing chlorophyll and the placebo ointment were supplied by the Rystan Company. The chlorophyll ointment contained .5 per cent water soluble derivatives of chlorophyll. The placebo medication usually employed was an ointment identical with the Chloresium ointment except for the substitution of inert green vegetable dye for the experimental ingredients.

surface of the denture ten times a day for four weeks.

Group 4 was composed of two patients with undiagnosed idiopathic, extensive, chronic, nonhealing, nonmalignant, oral ulcerations. Placebo medication was prescribed for four weeks, after which the ointment containing chlorophyll was applied ten times a day for four weeks.

Group 5 was composed of five patients with recurrent aphthous stomatitis. Placebo medication was prescribed during the course of one cycle, while the ointment containing chlorophyll was applied ten times daily during the course of a second ulcerative cycle. Each patient was studied through a minimum of four cycles.

Group 6 was composed of 13 patients with idiopathic orolingual paresthesias. Placebo medication was given for two weeks, followed by the administration of the ointment containing the chlorophyll, applied ten times a day to the affected areas for four weeks.

Group 7 was composed of 20 patients with mucosal ulcerations that had resulted from the insertion or the wearing of dentures. Placebo medication was prescribed in ten cases to be applied ten times a day until the lesion healed. In ten matched cases the ointment containing chlorophyll was applied ten times daily from the initial visit until the ulcer was adjudged healed. In both groups appropriate remedial measures were taken in regard to the area of the dentures that caused the ulceration.

RESULTS

In a comparison of the results of therapy obtained during the control period with those obtained during the period when the group was treated with chlorophyll, it was found that the ointment containing chlorophyll did not exert a significantly beneficial effect in the treatment of any of the diseases under consideration. The normally expected clinical appearance—course, duration, pain, discomfort and over-all severity of all lesions—seemed relatively unaffected by the application of the ointment containing chlorophyll when compared with the results obtained after the use of the placebo medication under the conditions of this study. No deleterious action attributable to the ointment containing the chlorophyll was observed.

This report directs attention to the difficulties and resultant inconsistencies encountered when an attempt is made to obtain the same results in oral disease as described in the medical literature. These inconsistencies seem to be caused by the extremely different environment of the oral cavity wherein lesions peculiar to this location must be dealt with and the characteristic and unusual problems of topically applying medications intraorally; for instance, the difficulty of maintaining medications in place in the face of constant salivation, the constant trauma involved in oral function, and the specificity of the oral tissues themselves.

Truth • For truth and keeping of faith belong to men as men, and not as members of society. *John Locke, of Civil Government.*

Autogenous transplants

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The permanent first molar mortality in the average youth of today is appalling. For many years the dental profession has maintained that the first permanent molars are the "keys to occlusion." Research on facial growth and development provides proof that the position of the first molar in the forming dental arch is of primary significance in the developmental pattern of the dental occlusion. According to the following reports, almost half of the teen-agers of today are doomed to become dental cripples through the loss of one or more first permanent molars.

Brekhus[1] concluded that by the age of 15, approximately 30 per cent of the boys and 35 per cent of the girls have lost, or need to have extracted, one or more of their first permanent molars.

Cheyne and Drain[2] noted that out of 520 permanent teeth recorded as missing in one group of young people between the ages of 10 and 15, 462, or 89 per cent, were first permanent molars, while only 36 were bicuspids and 22 were other permanent teeth.

In a recent school survey it was reported that approximately 46 per cent out of 8,677 children examined had lost one or more of their first permanent molars.

The dental profession is fully aware of the crippling effects of dental caries. Well-organized intensive research and nation-wide educational programs concerning dental hygiene are being conducted by the profession in a tremendous effort to turn the tide of battle against mankind's most common and financially burdensome disease.

First permanent molar loss is almost certain to result in a high percentage of the teen-agers, however. Some of these potential dental cripples may be suitable candidates for autogenous transplants. In selected instances, where mouths are relatively free of incipient caries and soft structures are firm and healthy, it may be possible to transplant surgically a developing third molar to a first molar host site. By keeping the dental arch intact through autogenous transplants, it may be possible in some cases to avoid the crippling effects of the loss of the first permanent molar.

REVIEW OF LITERATURE

Over many years favorable clinical experiences with dental transplants have been recorded in scientific publications.

John Hunter[3] stated:

Presented before the combined Sections on Oral Surgery and Anesthesiology and Complete Prosthodontics, ninety-fourth annual session, American Dental Association, Cleveland, September 28, 1953.

Professor of oral surgery, University Hospitals, State University of Iowa.

1. Brekhus, P. J. A second census of dental conditions in University of Minnesota freshman students. J.A.D.A. 28:1126 July 1941.

2. Cheyne, V. D., and Drain, C. L. Dental caries and permanent tooth extraction; a study by age, sex, and location of the incidence of first permanent molar extraction in 8,677 school children. J.D. Res. 19:570 Dec. 1940.

3. Hunter, John. A practical treatise on the diseases of the teeth intended as a supplement to the natural history of these parts. London, 1778.

There is a tendency for all living substances to unite when brought into contact with one another. A tooth which has been extracted for some time, so as to lose the whole of its life . . . will never become firm and fixed.

Hunter contended, however, that the periodontal membrane retained its vitality for periods up to as long as 24 hours, even though the tooth with its membrane attached was not in its natural environment. Hunter transplanted healthy teeth into the vascular combs of roosters to preserve the life of the periodontal membrane for future use. This preservation of teeth for later use would constitute, in effect, a "tooth bank."

In 1938 Kostecka[4] reported successful tooth transplants in animal studies. In 1941 Lapchinsky and Malinovsky[5] transplanted developing tooth buds from puppies into the alveolar sockets of adult dogs. The fresh transplants were described as having grown to full size in their new positions. In addition, the researchers recorded that successful transplants had been accomplished by sacrificing the donor puppies on the day preceding the transplant procedure and storing the jaws of the sacrificed puppies overnight in a refrigerator. Thus again, the practicability of a tooth bank was investigated.

In 1945 Shapiro and Maclean[6] reported that from their research on animals they had concluded that "intra-alveolar tooth germ transplants are capable of differentiating and persisting." Their studies dealt with the transplantation of developing tooth germs in the mandibles of cats.

In recent years clinical case reports of successful transplants have been noted frequently in the professional literature. Apfel[7] in 1948 and Miller[8] in 1951 are among those who have reported success with autogenous transplants in selected clinical cases.

Current medical literature records the frequent use of bone, cartilage, artery, and even eye banks in many of the large medical centers. In the light of present day research and clinical experience it is just as feasible to consider the establishment of tooth banks to preserve selected developing teeth for favorable transplant cases. The viable tooth transplant would be subject to much the same limitations and physiological conditions as apply to the viable bone or cartilage transplant.

Frequently in the teen-age group, third molars and first bicuspids require surgical removal at a time when the crowns are fully formed but the root development is just beginning. In these developing teeth an embryonic substance, gelatinous in appearance and consistency, adheres firmly to the "cupped-out" developing root end. Studies in dental histology have shown that, when definite root development can be observed roentgenographically, the development of the coronal portion of the enamel organ has, for all practical purposes, been completed. Therefore, if 3 to 5 mm. of root development can be observed in the roentgenographic studies, the time is favorable for the utilization of the developing dental organ as an autogenous transplant.

Some of the theories and surgical technics advanced by those experienced in dental transplant problems are not in complete accord. There seems, however, to be one point of agreement—the most favorable time for performing a dental transplant seems to be when the crown has completely developed and approximately 3 to 5 mm. of root development may be observed in the intraoral roentgenogram. The odontogenesis of this selected transplant has been the most favorable, according to the recorded observations and our clinical experience.

4. Kostecka, F. Transplantation of tooth germs. D. Record 58:210 April 1938.

5. Editorial. Lancet 241:78 July 19, 1941.

6. Shapiro, H. H., and Maclean, B. L. Transplantation of developing tooth germs in the mandible of the cat. J.D. Res. 24:93 April 1945.

7. Apfel, H. Autoplasty of enucleated prefunctional third molars. J. Oral Surg. 8:289 Oct. 1950.

8. Miller, H. M. Tooth transplantation. J. Oral Surg 9:68 Jan. 1951.

COMMENT

Autogenous transplant cases should be selected carefully. Some of the indications for and against this procedure are noted here.

First, the patients selected for this procedure must be thoroughly screened so as to be certain that their oral condition warrants the contemplated surgery. Patients especially susceptible to caries, with many missing teeth or with unhealthy gingiva, those in poor general health, and those who, even after explanation, are not psychologically prepared and desirous of undergoing this surgical procedure, are unpromising surgical cases. Also, a suitable dental transplant must be obtainable.

Second, there must be adequate mesiodistal width in the host site to receive the proposed transplant. Thorough preoperative measurements taken from suitable intraoral roentgenograms, plus careful inspection of the dental arches in both open and closed relations, should provide this essential information. Collapsed mesiodistal space resulting from interproximal caries of the tooth that was removed from the host site may mean there is insufficient space to accommodate the transplant.

Third, there must be no pathologic condition present in the host site. A chronic periapical or parietal pathologic condition in the site often can be surgically eliminated during preparation. The therapeutic use of antibiotics systemically and locally in the host site no doubt has contributed to the reported success with many of the transplant cases.

Fourth, the transplant should be thoroughly immobilized and protected during its first two or three weeks in the new site. The presence of a tooth mesial and one distal to the host site aids materially in the retaining of surgical splints. Rigid support during the period of early healing for jaw fractures or traumatically displaced teeth has been standard operative procedure, and therefore the mere suturing of the mucoperiosteal flaps to secure the transplant seems inadequate. A number of successful transplant procedures have been reported, however, in which the mucoperiosteal flaps were the only support for the transplant.

Fifth, some question has been raised as to the lack of proper root development in some transplant cases. It should be remembered that the length of the root of a developing dental transplant will depend to some extent on the apical depth of placement at the time of surgery. The formation of a lamina dura in the host site around the root of the transplant impedes additional apical development. Therefore, as odontogenesis occurs the transplant will erupt, but in so doing the developing root is directly dependent on the vertical space that is available prior to its reaching the level of functional occlusion.

It has been reported frequently that the transplanting of fully formed teeth has resulted in ultimate root resorption. The vascularization essential to the maintenance of a viable tooth is difficult to reestablish in a fully formed tooth, and tooth structure that does not receive a nourishing vascular supply is slowly resorbed.

It is logical to assume, with regard to the developing transplant in which the crown is completely formed and root development is in its early stages, that the organizing blood clot around the transplant in the host site can establish more readily the necessary vascular supply through the gelatinous mass at the developing root end and in that way maintain viability in the developing tooth.

Viability is dependent primarily on the re-establishment of the vascular supply to the pulp and periodontal membrane attachments. Innervation may or may not be complete to transplants, and therefore vitality tests are not a reliable indication of the success or failure of a postoperative dental transplant.

SURGICAL PROCEDURE

The following is our routine surgical procedure when a suitable third molar is available for transplanting and there is need for such a procedure because of the required extraction of a first molar (Fig. 1).

All of the patients receive systemic antibiotic therapy preoperatively. The surgery is accomplished under either local or general anesthesia, depending on the requirements of the patient. The surgical field is wiped down with a suitable bacteriostatic solution and then isolated with sterile surgical sponges. Suction tips and sterile sponges are used constantly to keep the field as clean as possible and to provide good vision of the surgical field.

A sharp incision through the periosteum is carried from the distobuccal region of the developing third molar across the crest of the ridge to the distolingual aspect of the second molar, and then around the gingival margin to the buccal aspect of the second molar and forward to the distal aspect of the second or first bicuspids, if necessary, to afford adequate exposure of the surgical field. The mucoperiosteal flap is freed and elevated gently with a minimum of trauma (Fig. 2). Either a surgical bone bur or sharp bone chisel, or both, is employed to eliminate the overlying osseous structure, and the third molar is adequately exposed for removal. The dental follicle surrounding the crown of an unerupted tooth has fulfilled its intended purpose when the development of the crown has been completed. Therefore the grasping of the crown of the transplant with forceps at this stage of development should not injure the tooth. The application and manipulation of elevators or forceps or both to the crown of the transplant must be gentle so that excessive trauma to the root sac may be avoided. The transplant is freed and then permitted to remain in its socket until the host site has been prepared to receive it.

The first molar is removed carefully, and the interseptal bone between the sockets is eliminated with rongeur forceps, chisels or bone burs of the surgeon's choice. Any chronic pathologic tissue is curetted from the host site. Should this site need to be enlarged at the crest of the ridge to accommodate the transplant, it can be accomplished readily with bone burs or chisels. After removal of the first molar and the interseptal bone, free hemorrhage should provide ample bleeding for formation of a suitable blood clot for the transplant.

The transplant is elevated carefully with forceps and transferred to the host site and positioned as desired (Fig. 3). Local antibiotics (400,000 units of penicillin G in soluble tablet form) are inserted into the host site to minimize loss of the initial blood clot through bacterial activity. The mucoperiosteal flap is repositioned and sutured with no. 000 black silk.

Stainless steel fracture wire, .015 gauge, is passed around the distal aspect of the second molar at the cervical line of the crown and crossed over the transplant in a figure eight. The lingual strand is carried forward to the mesial aspect of the cuspid in that quadrant and passed through the interproximal from the lingual to the buccal, where it is joined by the buccal strand, and the two ends are twisted securely. Interproximal ties then are passed between the bicuspids so as to embrace both the buccal and lingual wire strands and the contact point, and they are twisted securely on the buccal side (Fig. 4).

Surgical cement is mixed on a sterile glass slab. This cement is incorporated on long strands of cotton fiber, and separate rolls are adapted on the buccal and lingual aspects of the teeth from the second molar to the cuspid region. This splint is best adapted with wet fingers. It should be molded well into the interproximal spaces and over the site of the transplant (Fig. 5). The teeth must be able to close

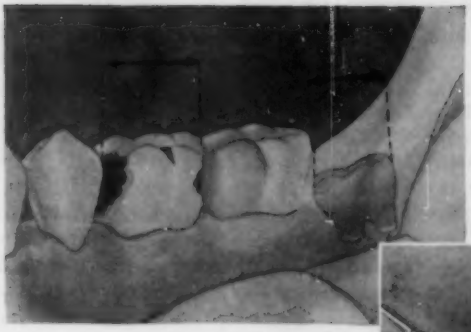

Fig. 1 • Left: Nonrestorable first molar in teen-age patient. Developing third molar suitable for transplant

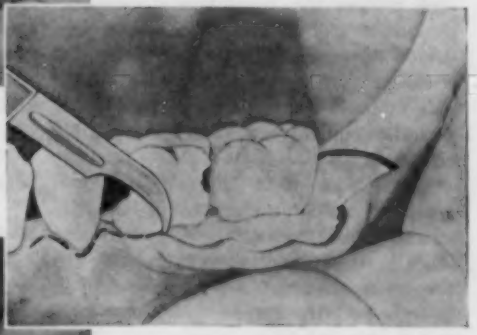

Fig. 2 • Right: Incision and elevation of mucoperiosteal flap

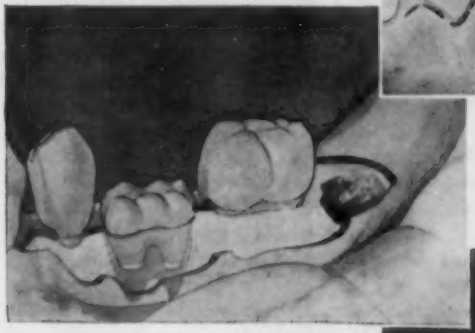

Fig. 3 • Left: Positioning of transplant

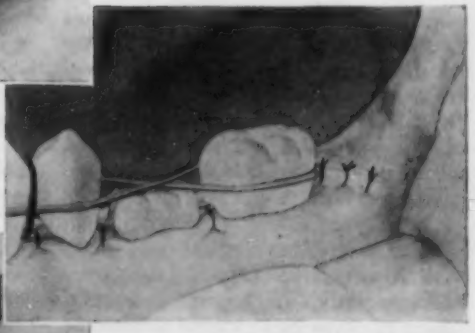

Fig. 4 • Right: Flap sutured and transplant immobilized

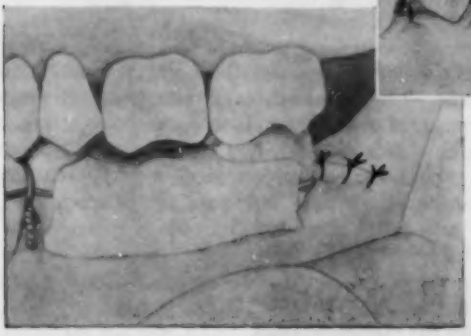

Fig. 5 • Left: Additional immobilization of transplant with surgical cement splint

into functional occlusion, and there must be no occlusal pressure from the cement splint over the transplant region.

The patient is instructed as to general mouth care, diet and sedation, and an appointment made for postoperative care and observation.

The surgical splint is maintained for approximately two weeks to help stabilize and protect the transplant during the period of clot organization. After this period the surgical splint and sutures are removed. The patient is advised as to care of mouth and diet, and kept under periodic clinical and roentgenographic observation.

Occasionally it is desirable to use an acrylic space maintainer to prevent the second molar from shifting mesially and blocking the transplant as it erupts. Such a space maintainer must be relieved frequently over the ridge area so as to permit the transplant to erupt.

Postoperatively these patients are routinely kept on antibiotics for 48 to 72 hours. If systemic evidence warrants, antibiotics should be continued as long as indicated.

CONCLUSIONS

1. First permanent molar mortality in teen-agers occurs so frequently percentagewise that the dental profession should be aware of the advantages of a transplant and recommend its use whenever indicated.

2. Autogenous transplants in selected cases are practical surgical procedures.

3. Further studies and investigations should be made with regard to the feasibility of salvaging, for purposes of transplanting, selected teeth removed during early root development.

Steel scalpel for gingivoplasty in reconstructive dentistry

Leo H. Roper, D.D.S., New York

Gingivoplasty, the surgical re-establishment of physiologic gingival architecture, has been employed in periodontal therapy for a number of years.[1] When the architecture is physiologic or normal, the gingiva tapers to a knifelike edge at its crest next to the tooth surface. This contour is necessary, since otherwise a ledge would be formed on which debris might lodge.[2] Such a ledge would be a considerable obstacle to maintenance of health in a natural dentition. In a mouth with many reconstructions the handicap would be much greater. Since the gingivae in mouths which require reconstructive dentistry are seldom ideal, it is apparent that

Department of periodontia, Mt. Sinai Hospital.

1. Goldman, H. M. Periodontia, ed. 2. St. Louis, C. V. Mosby Co., 1949, p. 18.

2. Report of evaluating committee IV. Treatment of periodontal disease. J.A.D.A. 45:26 July 1952.

some consideration of abnormal gingival tissues is necessary in planning reconstructive procedures.

The necessity for the management of abnormal gingival tissues is occurring with increasing frequency today because of a change in reconstructive dentistry itself. Improvements in technic, material and instruments plus the added interest of the profession in the work itself are largely responsible for the present widespread practice of complete mouth reconstruction. In this work the full crown, veneer crown and porcelain jacket have become the abutments of choice for many dentists; the condition of the gingivae and their position in relation to the margins of the crowns or jackets become factors of primary importance.

The exact position for the gingival margins of crowns or jackets is still a controversial point and needs clarification. That this position cannot be an arbitrary or fixed one becomes obvious when the crown-gingiva relation is considered.

In normal adult mouths, the gingivae are attached at or near the cementoenamel junction. It has been recommended that in such mouths Class II preparations as well as those for crowns and jackets be carried just below the free margin of the gingiva.[3, 4] In these ideal conditions, of course, the length of the preparation corresponds approximately to that of the anatomical crown.

Unfortunately, however, most mouths have undergone pathological changes, and the gingivae have often receded. The clinical crown in such instances includes part of the root. Where recession has not taken place, the architecture of the gingivae may have been altered so that the tissues are hyperplastic. The margins of the preparations, therefore, can no longer be determined by their position in respect to the gingivae. The lengths of the restorations must be decided by other factors, and the gingivae should be repositioned and reshaped to harmonize with the restorations. This procedure is essential if a physiologic balance is to be maintained.

INDICATIONS

The best method for repositioning and reshaping the gingival margins is modified gingivectomy or gingivoplasty. There are many indications for gingival surgery in reconstructive procedures. The following are a few of the more common ones:

Deep Gingival Crevice • The deep gingival crevice which persists or recurs after conservative periodontal treatment presents a most perplexing problem, since inflammation of long standing often produces gingival tissue which is thick and fibrotic.[2] A crown or porcelain jacket with margins that terminate under such gingivae will cause congested, cyanotic tissue, which often appears blue and ugly a short time after cementation. Seepage from such fibrotic gingivae makes even the insertion of a simple Class V filling a difficult procedure. The difficulty is greater with the cementation of a large bridge or a multiple-abutment splint.

Inverted Interproximal Papilla • An inverted interproximal papilla will cause trouble if it is not corrected. The labial and lingual margins stand away from the tooth, producing a labiolingual crater. No amount of curettage or home care seems to reduce this fibrotic tissue. Such cases are often the sequelae of chronic necrotizing ulcerative gingivitis, or they may occur when the interproximal papilla has been punched out and destroyed by a protruding or overhanging filling. Interproximal gingival concavities occur also in mouths in which the teeth are rotated, with the result that the roots are brought

3. Tylman, S. D. Theory and practice of crown and bridge prosthesis, ed. 2. St. Louis, C. V. Mosby Co., 1947, p. 112-115.

4. Gabel, A. S. American textbook of operative dentistry, ed. 8. Philadelphia, Lea & Febiger, 1947, p. 268, 269.

into close proximity to each other. It would scarcely be sound practice to terminate a crown or a jacket in such a gingival crater.

Short Teeth as Abutments for Bridges or Partial Dentures • Often the crown is shortened because of a heavy gingival margin, particularly next to the edentulous region. This margin presents a future hazard especially when precision attachments are to be used. The gain of two or three additional millimeters in length for such an abutment tooth can make the difference between a result which is completely satisfactory and one which is only indifferently successful.

Uneven and Unesthetic Gingival Lines of Anterior Teeth • In many instances, when complete mouth reconstruction is necessary, the gingival margins of the anterior teeth form an uneven line. If this irregularity is not corrected, the jackets or veneer crowns as a result may not be uniform in length. This lack of uniformity can constitute a hazard of major proportions in cases where the lip line is above the necks of the teeth.

Gingiva Requiring Repositioning • Repositioning the gingiva in the direction of the apex can be helpful in many instances in operative procedures. It is especially useful when the hydrocolloid impression technic is used.

These are but a few of the more striking gingival abnormalities which are indications for gingivoplasty in connection with reconstructive procedures. There are also many less striking abnormalities for which gingival surgery can be equally helpful to the general practitioner. Once the technic is adopted, each dentist will discover his own list of indications.

PREPARATION

Before surgery is resorted to, the mouth should be put in a state of thorough cleanliness in the recognized, established manner.[5] None of the proper periodontal procedures should be omitted. The teeth should be thoroughly scaled, gingival pockets curetted, and a regimen of home therapy instituted. These measures usually will result in a reduction of the inflammation, a diminution of pocket depth and a keratinization of the marginal epithelium. Gilson states:

> Prior to any gingivectomy or surgical procedure the acute inflammatory process should be eliminated. The reduction in swelling decreases the depth of the pocket to some extent, there is less granulation tissue present in the pocket, and there is less hemorrhage during operation.[6]

Unfortunately, as is well known clinically, all gingival problems cannot be completely resolved by conservative methods alone. When conservative methods do not produce the desired results, gingival surgery will restore the physiologic architecture necessary for the maintenance of health.

INSTRUMENTS

Saghirian,[7] Brecker,[8] Strock[9] and others have recommended gingival surgery as an aid in reconstructive dentistry. Their emphasis, however, has not been on the problem itself, but on the use of a particular instrument—the electrosurgical scalpel. These men have demonstrated the electrosurgical knife and its adaptability in the removal of gingival tissues in thin layers. Although the electrosurgical knife can remove and reshape gingival tissues admirably when used by those who have mastered its use, it has certain disadvantages. First, the general

5. Hard, Dorothy G. The conservative treatment of periodontal disease. J.A.D.A. 44:725 June 1952.

6. Gilson, C. M. Surgical treatment of periodontal disease. J.A.D.A. 44:733 June 1952.

7. Saghirian, L. M. Electrosurgical gingivoplasty. Oral Surg., Oral Med. & Oral Path. 2:1549 Dec. 1949.

8. Brecker, S. C. The porcelain jacket crown. St. Louis, C. V. Mosby Co., 1951.

9. Strock, M. S. Rationale for electrosurgery. Oral Surg., Oral Med. & Oral Path. 5:1166 Nov. 1952.

practitioner is reluctant to invest in a relatively large and expensive piece of equipment. Secondly, as Saghirian writes, "Electronic surgery has foundational limitations that no skill and judgment can overcome."[10] In addition, according to Strock, electrosurgery has the following disadvantages:

"1. The offensive odor.

2. The need for electric current.

3. The need for setting up a complex and separate apparatus.

4. The explosive hazard with ether or cyclopropane.

5. The slightly retarded primary repair.

6. The need for profound anesthesia.

7. The ease with which damage can be caused by the untrained operator."[9]

None of these disadvantages should be considered serious enough to deter anyone who is interested in mastering this instrument, which is especially useful in gingival surgery. Almost any gingival knife, however, can be used to accomplish the same operation with results that are equally effective. The reason for the introduction of the electrosurgical unit for this type of operative work at all was the difficulty in using the steel knives to trim the gingivae in thin sections, as is necessary in gingivoplasty. This difficulty is possibly due to the fact that heretofore the knives were used only to cut the tissue.

Gingival tissue, however, can be removed accurately and in thin layers with steel knives by another method, which is simple and quick. This technic can best be described as scraping or shaving. In this technic, the cutting edge of the scalpel is held at right angles to the gingiva, and the blade is scraped across the surface in much the same manner as a knife blade is used to scrape the peel off a potato or carrot. If this scraping method is used, gingivoplasty and surgical repositioning is not at all complicated and needs no extensive training. Furthermore, it is practically bloodless, and there is virtually no postoperative pain (Fig. 1).

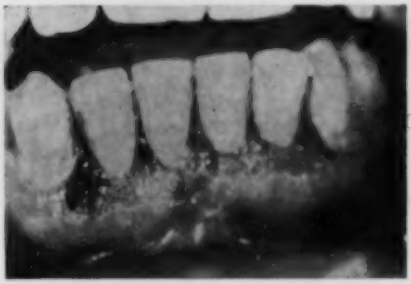

Fig. 1 • Appearance of gingivae after gingivoplasty by scraping method

TECHNICS

There are three technics which are useful for performing a gingivoplasty in connection with restorative dentistry. In the first technic, all gingival work is completed before any operative procedures are started. In the second technic, the gingival surgery is performed during the same sitting at which the teeth have been prepared and the impressions have been taken. In the third technic, the gingivoplasty is performed after all operative procedures have been completed and often even after all reconstructions have been finished.

In the first procedure the gingival papillae are dried, and a topical anesthetic is applied. A 5 per cent lidocaine hydrochloride ointment (Xylocaine) is an effective topical anesthetic. In a few minutes this ointment will supply sufficient anesthesia to permit painless injection of the local anesthetic of choice, lidocaine hydrochloride 1:100,000. With a no. 30 gauge needle, the solution is injected directly into the papilla. The anesthesia spreads quickly as the needle is advanced.

10. Saghirian, L. M. Theory and practice of electric surgery. New York J. Den. 22:390 Nov. 1952.

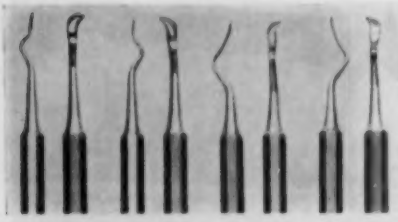

Fig. 2 • Set of scalpels for gingivoplasty

Although almost any gingival scalpel may be used, a set of four scalpels has been designed by the author, two for the anterior portion and two for the posterior portion of the mouth (Fig. 2). These knives have small blades for better accessibility in interproximal work. The edges have been honed so that they are sharp enough for scraping action. Where deep gingival pockets are to be reduced, the knives are used to cut off the excess crevicular margin. The remaining tissue can be thinned down and festooned by scraping. Any part of the mouth can be reached with ease, and the gingival architecture can be altered almost as readily as can wax with a hot spatula; since gingival tissue is resistant, however, more pressure must be applied. Figure 3, above, shows a case in which a gingivoplasty was performed because the marginal gingiva was thick and fibrotic. The tissue was recontoured by scraping. Since the inflammation had been reduced previously, there was practically no bleeding.

After the operation a surgical pack is applied. A satisfactory one is made of: liquid—50 per cent almond oil and 50 per cent eugenol; powder—45 per cent finely powdered rosin, 45 per cent zinc oxide and 10 per cent tannic acid. The pack (Fig. 3, center left) is mixed to a consistency of putty so that it can be handled with wet fingers without any sticking. Adhesive tin foil placed over the region protects the pack until it sets (Fig. 3, center right). The pack should be replaced if it chips off. After a week, the pack is removed, the area washed and the pack replaced. The following week the pack is removed (Fig. 3, below), and home therapy is begun.

In the second method, the operation is performed at the same sitting at which the teeth are prepared. In this technic the temporary crowns or splints protect the underlying pack. Figure 4 shows a case where the bicuspids were prepared as a double abutment for veneer crowns. At the same sitting, the gingiva was surgically repositioned. Both bicuspids were too short for ideal abutments, and the gingival margins were thick and fibrotic, especially distal to the second bicuspid. Since this tooth was to carry a precision attachment, the additional 3 mm. gained by gingival surgery was an important advantage. The temporary acrylic crowns were used to keep in place and help protect the surgical pack.

In the third method, the technic is identical with that of the first except that the temporary bridges, crowns or splints protect the pack. Figure 5 shows a case where the gingivoplasty was performed after the reconstructions had been completed. It was decided that the fibrotic gingiva presented a hazard in cementation and a future hazard in maintaining a physiologic balance. The temporary acrylic splints were used to protect the pack.

EVALUATION OF TECHNICS

First Method • The advantages of completing gingival work before any operative procedures are begun are:

1. The work on large sections can be completed at each visit.
2. The new gingival line has been reestablished before operative procedures are begun.
3. The healed gingivae afford better visibility and access for operative procedures after repositioning.

The disadvantages of the first method are:

1. Additional visits and anesthesia are necessary.
2. It is difficult to maintain the surgical pack.

Second Method • The advantages of performing the surgery after the teeth have been prepared and the impressions have been taken are:

1. In one visit and with the same anesthesia, the operation is performed, and the teeth are prepared.
2. The surgical pack is held in place more securely by the temporary crown or bridge.

The disadvantage of the second method is that some clinical experience is necessary to determine the extent of the gingival extension of the preparation and also the amount of tissue to be removed.

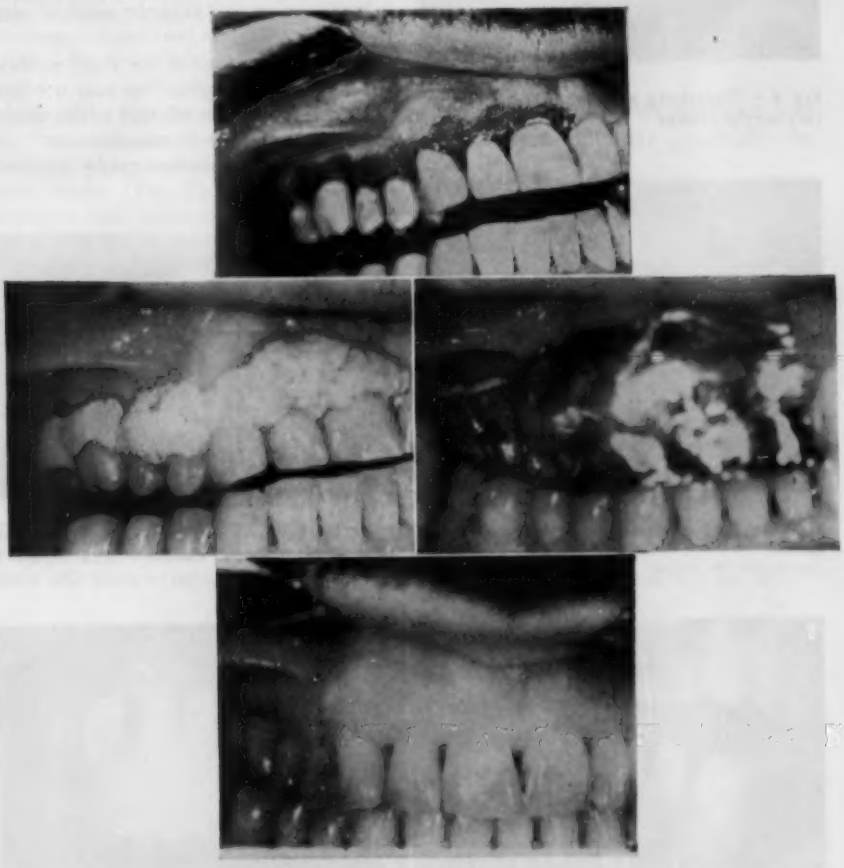

Fig. 3 • Above: Tissue recontoured by scraping. Center left: Surgical pack applied after gingivoplasty. Center right: Adhesive tin foil protecting surgical pack. Below: Appearance after removal of pack

Third Method • The advantages of performing the gingivoplasty after other work has been completed are:

Fig. 4 • Underlying pack protected by temporary acrylic crowns

Fig. 5 • Pack protected by temporary acrylic splints

1. Abnormal gingivae which may have been overlooked up to this point can be corrected. In the case shown in Figure 6, when the crowns were tried on the preparations, the margins impinged on the hyperplastic tissue. After the gingivoplasty, however, the crowns could be cemented safely, and the gingiva could be maintained in health with proper home care.

2. As in the first method, large sections can be operated on at each visit. In addition, the temporary bridges will protect the region and keep the surgical pack in place.

The disadvantage of the third method is that the new gingival line may not heal exactly as desired in relation to the finishing margins of the reconstructions.

Clinical comparisons made between

Fig. 7 • Appearance after gingivoplasty with electrosurgical knife. Compare with Figure 1

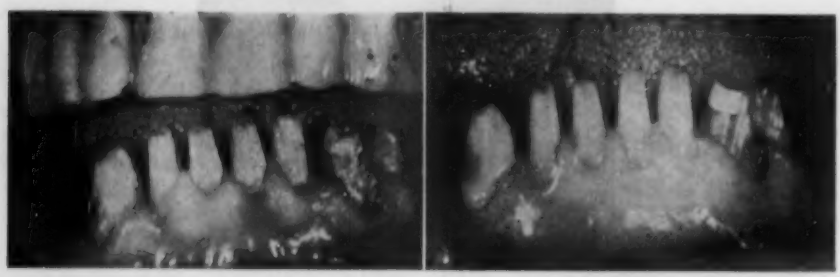

Fig. 6 • Left: Margins of crowns impinging on hyperplastic tissue. Right: Crowns cemented safely after gingivoplasty

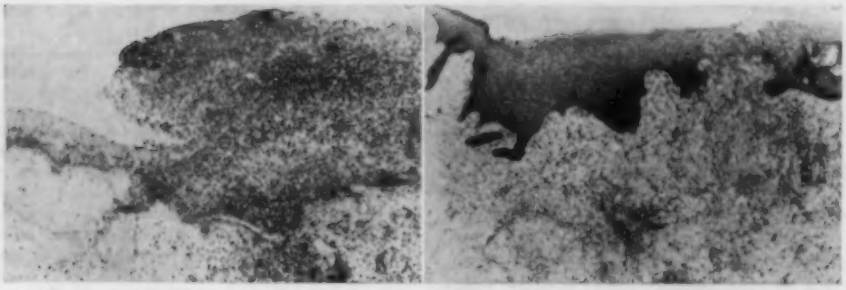

Fig. 8 • Left: Healing process in gingival wound immediately after gingival surgery. Right: Healing process 14 days after gingivectomy. Regeneration of normal epithelium and underlying connective tissue has taken place. (Courtesy of Balint Orban and American Journal of Orthodontics and Oral Surgery)

results with the electrosurgical scalpel and those with the steel knife show that the tissue is removed with apparently the same results (Fig. 7). Healing occurs perhaps a little faster after the use of the steel scalpel. The healed tissue appears exactly the same. The contention that either instrument will leave scar tissue cannot be substantiated by clinical or histological evidence, since gingival tissue does not heal in a cicatrix[11] (Fig. 8).

SUMMARY

1. Besides the common indications for gingival surgery in reconstructive dentistry there are many less striking abnormalities which the individual practitioner will learn to recognize.

2. The results with the steel knife and the electronic knife are practically the same.

3. Each of the three technics for gingival surgery has its advantages and disadvantages.

4. Whether the steel or electric scalpel is used, the gingival tissues must receive adequate attention and treatment from the general practitioner.

5. After the mouth has been reconstructed and the gingiva repositioned and recontoured, a definite system of home therapy must be instituted if the tissues are to be maintained in health and if future disease is to be prevented.

11. Schaffer, E. M. Biopsy studies of necrotizing ulcerative gingivitis. J. Periodont. 24:22 Jan. 1953.

Thought • Thought cannot be defined, but it is instinctively recognized even by those unaccustomed to it. *Christopher Morley.*

Cases and Comments

FOLDING WHEEL CHAIR EQUIPPED AS MOBILE DENTAL CHAIR

By Spence A. Hutt, D.D.S., Houston, Texas.

Today, considerable time, effort and money are being put into the inventing and perfecting of appliances that will comfort and aid the sick and physically handicapped. One such appliance that has proved efficient is the folding wheel chair which is being used in increasing numbers, not only in hospitals and institutions, but by individuals who suffer from physical handicaps that permit only limited movements.

The development of dental equipment necessary to meet all emergencies has not kept pace with modern dental practice. Ordinarily it requires the services of two ward personnel to lift a patient from a bed to a wheel chair, and another team of two dental assistants to help the patient get from the wheel chair into the dental chair. On completion of the dental treatment, the patient has to be assisted into the wheel chair and, on return to the ward, further aid is necessary to get the patient back into bed.

Mindful of the patients' distress from so much handling, I conceived the idea of converting the folding wheel chair into a mobile dental chair.[1]

TYPE AND CONSTRUCTION OF UNIT

A folding wheel chair was equipped with a support fashioned of two pieces of steel about two inches wide and ¼ inch in thickness. For the sake of comfort, the support was curved slightly so as to compensate for the sag in the material as the patient leaned against the back. The upper band was designed with a hooklike projection and a movable extension joint on one end, as well as a hooklike projection on the other end, which permitted both ends of the band to lock over the arms of the chair, and thereby prevented the support from slipping or becoming displaced. The lower band was adapted primarily for contact against the upright metal tube framework of the chair back. A tubular upright, 1½ inches square and 12 inches long was welded at right angles to both steel bands. This not only served as a holder for a Peerless headrest and bracket which were found to be adaptable to the over-all design of the mobile dental chair, but maintained the steel bands in proper position and space relationship at all times (Fig. 1, left).

Because the chair was on wheels, it was necessary to devise a means of locking it in a firm position when in use. Two pieces of ¾ inch wood, each approximately 6 inches wide and 10 to 12 inches long were used and, starting from a knifelike edge with a gradual incline to the center of each board, a section was grooved the full length of the boards, slightly wider than the width of the small rotating wheels at the back of the wheel chair. The diameter of the wheels was used for measurement, and the centers of the boards were grooved through to the floor so that the rubber

Chief, dental service, Veterans Administration Hospital.

1. Hutt, S. A. Detachable dental headrest for wheel chairs. Bul. U. S. Army M. Dept. 5:624 June 1946.

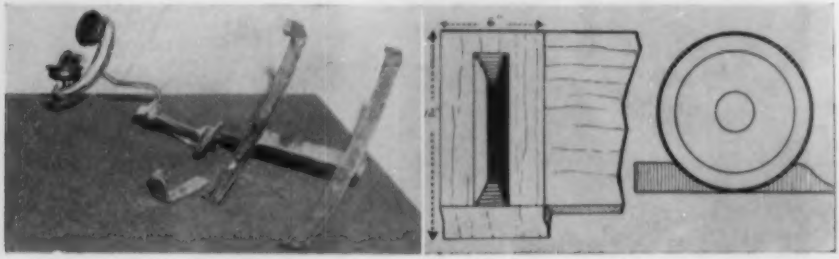

Fig. 1 • Left: Support to be used on wheel chair. Right: Diagram of "brake" developed for wheel chair

tires could grasp the floor firmly and act as a brake (Fig. 1, right). This not only facilitated rolling the chair into position alongside the dental unit, but secured it firmly in position and reduced the chances that it would move either forward or backward without exertion. The grooved "brakes" were held in position by a retention board secured to the floor by nails or screws. When the wheel chair was thus anchored in place, it was ready for the headrest.

DISCUSSION

For those who are responsible for dental treatment in installations without regular dental equipment, the mobile auxiliary dental unit for hospitals[2] and the wheel chair just described make an excellent combination. The combined use of these two custom-made pieces of equipment will prove efficient, economical and adequate in dental treatment management. Of course, in installations with completely equipped dental operating rooms, the regular dental chair would have to be removed when the mobile dental chair was used (Fig. 2).

SUMMARY

The primary purpose of the mobile dental chair is to eliminate unnecessary lifting and handling of handicapped patients. It enables the patient to receive better dental treatment because the accommodations are similar to those found in well established offices. The operator's fatigue is not any more pronounced when this equipment is used than when a regular dental chair is used. Because of the simplicity of the design, most engineers can construct this appliance using a minimum of material and at minimum expense.

2002 Holcombe Boulevard

Fig. 2 • Wheel chair equipped as mobile dental chair

2. Hutt, S. A. Mobile auxiliary dental unit for hospitals. J.A.D.A. 44:34 Jan. 1952.

Supporting Evidence Required • It is every author's duty to publish amply sufficient primary data and information to enable a reader to form a just and independent estimate of the confidence that may be placed in the inferences that the author has drawn therefrom. If he does not, he is false to both his reader and himself, and his inferences should carry little weight, no matter how great his reputation may be; . . . .

Indeed, values reported without such satisfactorily supporting evidence have no objective value whatever, no matter how accurate they may happen to be. They rest solely on the authority of the reporter, who is never infallible. *N. Ernest Dorsey and Churchill Eisenhart, "On Absolute Measurement," The Scientific Monthly 77:109 August 1953.*

COUNCIL ON DENTAL HEALTH

Dental health programs in industry: introduction to symposium

David W. Brock, D.D.S., St. Louis, Mo.

The American Dental Association has long been interested in the development of sound dental health programs for industrial workers, and on several occasions its House of Delegates has adopted policies to guide dental societies in their work with industries in their respective communities. In 1941, for example, the Association adopted seven "Essentials of an Industrial Dental Service," which recommended that industrial establishments should have organized dental services with competent staffs to promote better dental health for the industrial workers.

The Council on Dental Health is convinced that the dental profession in this country has a real opportunity to provide the necessary leadership to assist in the promotion of soundly conceived programs for the improvement of the dental health of industrial workers. Moreover, the Council recognizes the opportunity that exists in industry for dental health education of adults.

Recently, the increased interest of labor unions in treatment programs has caused the Council to review policies of the American Dental Association that relate to such programs, to seek further information about labor union objectives, and to confer with labor union representatives about types of programs that can best meet these objectives. Association representatives held several conferences with the United Mine Workers in 1952, and, in February 1953, visited the central offices of the American Federation of Labor, the Congress of Industrial Organizations, the International Association of Machinists, the Railway Labor Executives Association and the United Mine Workers—five of the major labor unions in the United States. In April 1953 the Council conducted a conference in the Central Office to which representatives of these five unions were invited.

The following abstracts of papers presented at the Council's Fourth Annual Dental Health Conference at Cleveland in September 1953 summarize the exchange of ideas between spokesmen for the three groups most directly involved in industrial dental health programs: labor unions, representing workers; management and the National Association of Manufacturers, representing industry; the American Dental Association, representing the dental profession.

Symposium presented at the Fourth Annual Dental Health Conference sponsored by the Council on Dental Health, American Dental Association, September 26, 1953, Cleveland.

Chairman, Council on Dental Health, American Dental Association.

OBJECTIVES OF HEALTH PROGRAMS SPONSORED BY MANAGEMENT

McIver Woody, M.D., New York

Any health program sponsored by management should have two main objectives: first, to provide prompt treatment for accident cases; and second, to prevent and control disease among the employees in the plant. Both of these objectives are important, and no program can be entirely successful unless there is a proper balance between them. A satisfactory balance of the dental aspects of a health program is not easy to achieve, however, because compensable injuries of the mouth are not very frequent in civil life. Perhaps this is one of the reasons why industrial dentistry has not kept pace with industrial medicine during the past 40 years.

In the beginning, all the emphasis was on industrial surgery. Most of the laws on workmen's compensation enacted before 1920 were limited in their coverage. Only accidents that occurred during working hours were compensable, but they were both frequent and expensive. As a result, small plants arranged to have a physician on call at all times; larger companies had a physician visit the plant daily; and a few larger organizations set up small emergency hospitals with a qualified surgeon on duty. Minor injuries were taken care of in the plant, without loss of time from work; more serious cases were transferred to an outside hospital, where they were treated by the plant surgeon or by a specialist selected by him. In either event, the company physician got some of the credit when the results were good.

These industrial surgeons had abundant opportunity to win the admiration and respect of the employees; many of them became very skillful in the treatment of injuries; a few became interested in certain types of cases, published papers giving their findings and won wide recognition as authorities on the surgery of trauma. That was the hey-day of industrial surgery.

Two influences were at work, however, which shifted the emphasis from corrective to preventive measures. One was the increasing prevalence of claims for compensation that proved to be based on pre-existing physical defects; the other was the change in workmen's compensation laws to cover various occupational diseases, such as lead poisoning, silicosis and contact dermatitis. As a result, it became necessary for the company physician to examine all applicants for employment and record their physical defects, if any. Later on, he began to do periodic examinations on all employees whose work might expose them to occupational disease.

Through routine physical examinations, the company physician has begun to know the individual employees better, to understand their personal problems, and to appreciate the appalling prevalence of dental defects. He realizes that a dentist with his mouth mirror and explorer can find out more about an employee's teeth in a few minutes than he ever can, and he would welcome the dentist as a colleague without hesitation were it not that the dentist belongs to a separate profession whose specialized training limits the share he can take in the general work of the department. The toxicologist, the lung specialist, the dermatologist are physicians and can be used as such, giving them wider contacts in the plant from the very first. Consequently, it is all the more important that the industrial dentist have the privilege of contributing to both of the main objectives of the health

Chairman, Medical Advisory Group, National Association of Manufacturers.

program; first: the prompt treatment of all dental accidents by (1) taking care of most of them himself; (2) selecting the dental consultant when necessary; (3) accepting responsibility for results in either event, and second: the prevention and control of dental disease by (1) examining all applicants for employment, rating their oral health and seeing that dental defects are corrected; (2) participating in all special physical examinations.

In other words, the industrial dentist must be given every opportunity to win a place for himself in the plant and to achieve full professional status in the community. Whether he is employed on a full-time or a part-time basis, he should be selected with the advice and consent of the local dental society, and he should be the best man who can be obtained; for, after all, any dental health program is only as good as the dentist who is responsible for it.

THE INTEREST OF MANAGEMENT IN INDUSTRIAL HEALTH PROGRAMS

Maxwell C. Weaver, Cincinnati

The description of the industrial health and safety programs in this paper is based on a survey of the health and safety practices of the National Association of Manufacturers (NAM) membership. One of the objectives of the survey was to attempt to get a glimpse of the probable directions that such programs would take in the future. In addition to studying the typical health and safety practices, three other services—dental, visual and hearing care—were surveyed.

More than 3,500 companies employing 3 1/3 million employees cooperated in the survey. Two major types of services were found in the average health and medical program: (1) in-plant facilities with staff, and (2) out-of-plant medical services. It was found that 92 per cent of all responding companies reported health and medical programs.

Altogether, 5,015 physicians were reported as participating in the various health and medical programs. The distribution was 5 per cent for full-time physicians; 17 per cent for part-time physicians, and 48 per cent for "on-call" physicians. In the typical small plant, the "on-call" physician generally rendered the service. In the medium-sized company, the part-time physician assumed a larger role. Among large concerns, however, almost half of the companies employed full-time physicians (Fig. 1).

More than 1,800 companies, employing 3 million persons, reported pre-employment examinations; and more than 1,000 companies, employing 2½ million persons, reported periodic follow-up examinations (Fig. 2).

Education in disease prevention was reported by 944 companies, and education in personal hygiene, by 799 companies.

Almost all of the employees in the survey—over 3¼ million—were protected by accident prevention activities. About 1,400 companies, employing almost 2½ million persons, were carrying on safety education programs.

Prepaid health protection plans were reported by 3,046 companies covering more than 3 million employees, with

President and general manager, The Kendall Company.

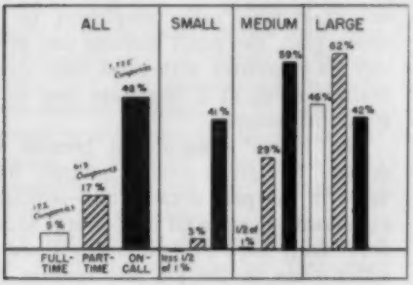

Fig. 1 • Distribution of 5,015 physicians participating in health and medical programs in small, medium-sized and large companies

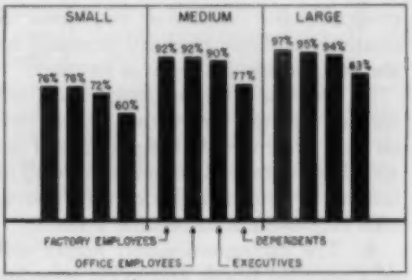

Fig. 3 • Prepaid health protection plans, covering 3.2 million employees, in 3,046 small, medium-sized and large companies

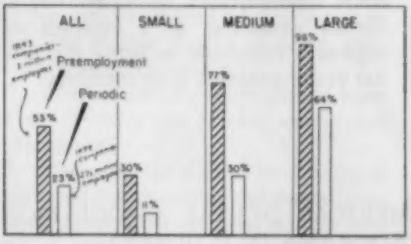

Fig. 2 • Distribution of physical examinations for employees among small, medium-sized and large companies

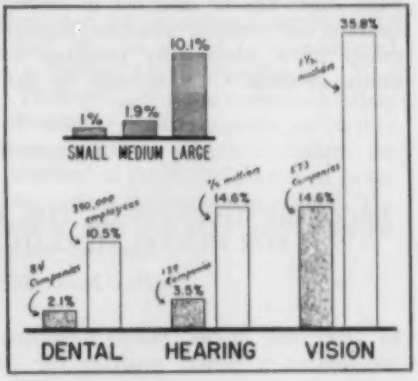

Fig. 4 • Small, medium-sized and large companies providing dental, visual and hearing care to employees

companies of all sizes reporting almost complete coverage (Fig. 3).

The results of the successful health and safety programs, as reported, were (1) reduction in compensation premiums, (2) reduction in accidents, (3) reduction in incidence of occupational disease and (4) reduction in absenteeism or labor turnover. Absenteeism, which costs industry millions each year, was reduced by 25.6 per cent.

Eighty-four companies employing about 390,000 men and women provided dental care; hearing care was reported by 139 companies with a total employment of more than a half million persons, and visual care programs were in effect in 573 companies employing almost 1½ million men and women (Fig. 4). These services are typically big-company practices. Proportionately ten times as many large companies had dental services as did small companies. The same pattern, to a somewhat lesser degree, was noted with respect to the other two services.

Some conclusions which may be drawn from the survey are as follows:

1. Vigilantly administered health and safety programs bring about extremely important and highly desirable results that are priceless in terms of human considerations and profitable in terms of tangible dollar savings.

2. The basic pattern of health and safety protection as provided in present

programs for industrial employees is relatively uniform, modified primarily by size of company and type of industry.

3. Physical examinations, the hard core of effective preventive health protection, while used in the majority of responding companies, must spread to all of industry if proper health care for industrial employees is to become a reality.

4. The disproportionately higher cost of a rounded health and safety program for medium and small companies emphasizes the fact that these companies frequently cannot—and need not—follow the traditional pattern of the large-company plan. The solution lies in sharing facilities and medical personnel, through group plans, community programs or similar projects. On that basis, by participating with other employers in a group plan, the small business can provide its employees with good, high-level health service at a moderate cost well within its means.

The survey is significant because it showed the great strides industry has made in the past decade, and—equally important—it revealed the job still to be done. Only industry—through voluntary action—can do the job that remains to be done to protect the health and safety of its employees. Moreover, industry has accepted the challenge and will turn it into a magnificent opportunity. The National Association of Manufacturers has already embarked on a vigorous and aggressive campaign to bring the problem to the attention of its members.

RECOMMENDATIONS OF THE AMERICAN DENTAL ASSOCIATION FOR DENTAL HEALTH PROGRAMS IN INDUSTRY

Ira Dow Beebe, D.D.S., Bridgeport, Conn.

In 1890, the Barber Match Company inaugurated a dental program for its workers. Nevertheless, 63 years later, the need for such programs for the nation's 60 million industrial workers and the unparalleled opportunities for dental health education of the adult population are still awaiting the enlightened and active leadership of the dental profession.

This is not to say that significant progress has not already been made. It has been. Interest in industrial dentistry in 1918 led to the founding of the National Association of Industrial Dental Surgeons and more recently, in 1943, of the American Association of Industrial Dentists. Actually, nearly all of the 73,500 dentists in private practice serve industrial workers. Moreover, these dentists, in their own communities and with their own dental societies, can accomplish much more than was ever dreamed possible to help working men and women achieve better dental health.

The necessity for dental health programs in industry has been demonstrated by a number of studies. One, among Navy and Marine Corps personnel, indicated that about 10,000 persons are ineffective each day because of dental disease. Navy personnel are not typical of the general labor force, however, and their sickness rate would be expected to be lower than that of the general labor force. A study in Tennessee industrial plants, in fact, showed a rate four and a half times as high, indicating that there may be 45,000 persons in this country absent from work each day because of dental disease.

The American Dental Association has

Chairman, Committee on Industrial Dentistry, Council on Dental Health, American Dental Association.

recommended that an industrial dental health program consist of five basic services for employees: (1) dental health education, (2) preplacement and periodic examinations by dentists, (3) referral to private practitioners for treatment, (4) keeping of accurate records and (5) emergency treatment for injuries and occupational diseases.

In addition, the Association has made five other recommendations that refer particularly to the organization and administration of the industrial dental program. The five principles are:

1. The program, in all of its policies and regulations, should be developed to assure the highest quality of dental care for the industrial patient.
2. The industrial patient should have the right to select the private practitioner of his choice.
3. The program should be developed in full consultation with the dental profession through the medium of state and local dental advisory committees. This principle ensures management and labor of good dental consultation which is essential for the development of a soundly conceived program in the community, and it charges the dentists with a responsibility to provide freely of their skills, knowledge and experience in those fields in which their qualifications entitle them to speak with professional competence.
4. All dental treatment services should be rendered by a licensed dental practitioner.
5. The dental program should be clearly integrated with the other health services constituting the industrial program, and the professional phases of the dental program should be administered by a licensed dental practitioner.

These principles and recommendations will mean very little, however, unless they become action programs under the leadership of the dental profession in the communities throughout the nation. The need is great and the opportunities are almost limitless.

AN INDUSTRIAL DENTAL HEALTH PROGRAM

Howard E. DeCamp, D.D.S., Corning, N. Y.

In 1925, the Corning Glass Works of Corning, New York, made a study of the causes of absenteeism, inefficiency and accident increase among its employees. The conclusion was that a large percentage of these conditions was caused by dental rather than medical illness. It was then decided that the only practical solution was to include a dental service in the existing medical program.

The company insisted that such a dental program should be so designed that the employee would receive the greatest possible benefit from a health standpoint, but that the program must not in any way interfere with the dentist in private practice. The local dental society was asked for advice and responded very willingly. At first, the private practitioners feared that such a program would draw patients away from their offices, but the company assured them that this was not the intention of the new arrangement.

The cost of the program is paid entirely by the company. The clinic is located in the company hospital and has a full-time dentist in charge. There are two operating rooms equipped with modern dental chairs, dental units and instrument

Director, Corning Glass Works Dental Clinic.

cabinets. One room is used for roentgenographic examinations. The roentgenogram processing room is complete and used jointly with the medical department. The location of the clinic within the medical department makes it convenient for the dentist to cooperate with the medical staff, and consultations are frequent. Very detailed records are kept of the services provided for each patient.

The following services are rendered to employees and pensioners: (1) prophylaxis, (2) relief of pain, (3) roentgenographic diagnosis, (4) emergency extractions, (5) educational programs and (6) miscellaneous treatment.

Each patient may have as many roentgenographic exposures as he or she desires. The films are studied before a diagnostic screen and explained to the patient, and a report is then prepared for him to take to his family dentist.

Patients go to the clinic as often as they wish—by appointment when possible—and at times that interfere as little as possible with production schedules. The clinic is open from 9 A.M. to 5 P.M. from Monday through Friday; however, emergency calls for injuries, hemorrhage and so on, are answered by the dentist at any hour.

The need for emergency extractions is caused by the fact that many times the employee, though informed of a condition, fails to carry out instructions.

In regard to the educational program, a detailed description is given at the chair to inform the patient of the treatment needed in his particular case. Instruction in mouth care is given as well as advice in answer to general questions regarding dental care for the employee's family. The company publications are used to give dental facts and suggestions directly to the employee, and they are taken home where he can read the facts at his leisure and share them with his family.

The entire program is conducted on the theory that it is part of the medical plan, and it is designed to improve the health of the employee, keep him happy and a producer of high quality glassware.

The local practitioners say that the service brings the employees to them informed of their needs and ready to cooperate. The information regarding dental needs obtained by the employee and taken home to the family prepares them to be interested in and to have a desire for dental health. What at first the practicing dentist feared has become a practice builder for him and a dental health and efficiency builder for industry.

The administration of such a clinic is difficult and should not be attempted unless one believes in the need for such a program. For the past 28 years, the speaker has devoted full time to this type of dentistry and is completely convinced that there is a great need for such service.

LABOR'S INTEREST IN BETTER HEALTH PROGRAMS

James Brindle, Detroit

Health security is a basic concern to all of us, and especially to the worker. This concern has been evidenced in labor's willingness in the past four years to allocate a substantial part of its economic gains in collective bargaining to pension and insurance programs.

Labor's interest in developing better health protection for workers dates back to the very beginning of American trade unions. In early programs, however,

Acting director, social security department, United Auto Workers—Congress of Industrial Organizations.

emphasis was on cash income. Benefits were low and the funds were actuarially unsound, but sickness benefits represented a start. A few groups, such as the International Ladies Garment Workers Union and the Amalgamated Clothing Workers, developed union-operated health facilities.

It was not until the depression of the 1930's that unions became generally aware that they were unable independently to cope with the problems of workers' risks. From that time, labor leadership began in earnest to explore the possibility of health programs through governmental action. Since Congress was reluctant to assume responsibility for comprehensive and adequate social security, including health insurance, unions supplemented existing governmental programs and also turned to collective bargaining to secure financial assistance from employers. World War II, with its "frozen wages" and high excess profit taxes, gave impetus to industrial benefit programs, and firmly established the principle of employer-payment for health and retirement programs.

Most large employers continued to resist the programs, however, until 1948 when the courts ruled that pensions and group insurance are conditions of employment and forms of compensation, and that employers are required to bargain with unions on these benefits. Organized labor promptly made pensions and health insurance major demands in collective bargaining. The success of this "two-way drive" for workers' security can be seen in the fact that in 1948 about three million persons were covered by health and welfare programs in industry while today, over ten million have such protection.

The impact of these programs is beginning to be felt in the community. Shortage of hospital beds in industrial areas is one result. However, the ability of the patient to pay, because of labor-negotiated prepaid hospital programs, has aided in maintaining existing hospital beds, in expanding hospital facilities and in improving hospital standards. Medical insurance, however, under collective bargaining programs, except in isolated instances, has not been established on other than a limited, cash indemnity basis.

Health services in the next decade will, we hope, reflect this sounder financing by moving toward the development of group medical practice and more comprehensive prepaid health services. The long-range implications of these improvements are obvious.

While we work to increase funds for the purchase of health services as a part of our collective bargaining contracts and to assist community organizations in building improved health programs, we shall also seek governmental action where needed.

We in labor want to have access to the kind of care which the professions have made possible. We want community-wide services for early detection of illness, adequate facilities for diagnostic procedures, high quality medical treatment for illness, hospitalization and rehabilitative services for all who need them. We want to accomplish this in a manner which assures that the services are organized and provided in an efficient and effective way and that the cost is met by a prepayment mechanism.

The underlying implication of the facts being discussed today is that labor, management, and the health professions must work more closely together in finding solutions for the problems of medical economics and administrative methods for assuring high quality medical services to all segments of society.

METHODS OF PROVIDING PERSONAL HEALTH SERVICES FOR MEMBERS OF LABOR UNIONS

George Nelson, Washington, D. C.

There are literally hundreds of different types of health and welfare plans in existence today. To illustrate, a 1949 survey showed that out of 2½ million workers in some 6,800 firms which had health and welfare plans in existence, 33 per cent of the workers was covered by a commercial insurance plan, 35 per cent by Blue Cross and 13 per cent by Blue Shield, while 19 per cent came under other types and combinations of plans.

In addition, medical service centers have been organized by some industries and by some unions. Cooperative and community-based group health plans also have been set up in recent years which not only include union members as subscribers but also contract directly with labor unions for health services.

We can now take a look at some of the most popular methods and plans to evaluate the vital protection they afford.

First, let us look at a welfare plan inaugurated by an International Association of Machinists District in one of our midwestern cities. It is a cash-indemnity, commercial insurance program provided as a regular benefit through negotiation with the respective employers as a provision of collective bargaining agreement. It has been in effect since 1949, and at present, benefits are available to the worker and his, or her, family.

The schedule of benefits includes $2,000 life insurance, the same amount for accidental death, dismemberment and loss of sight; $30 weekly for accident and sickness; $9 daily room and board hospital expense, $300 surgical expense; $4 hospital medical care, and $50 diagnostic roentgenographic and laboratory examinations. Maternity benefits are included.

The importance of the plan covering the worker's family should be emphasized, since about 75 per cent of a worker's health expense is for his family.

This plan is one of the best of the commercial insurance policies in existence today. There are over 11,000 members enrolled in one metropolitan area. They have the facilities for the specified health services, including equipped hospitals, health personnel and the component services. There have been four increases in benefits, and new benefits have been added since its inception about four years ago. Unfortunately, this is the exception instead of the rule.

Another method of health insurance commonly used by labor unions is the Blue Cross Hospitalization Plan and the Blue Shield Plan. Benefits vary according to area conditions and available facilities. To analyze these plans as they relate to our membership, I wish to quote from remarks made by the president of the United Steelworkers Union to the annual conference of Blue Cross and Blue Shield Plans in April of this year [1953]:

> Among improvements in our program for prepaid hospital and medical care that we see to be essential can be summarized under three broad headings:
>
> First, early diagnostic and preventive medical care.
>
> Second, payment of medical, dental, drug and appliance bills.
>
> Third, payment of all hospital bills.
>
> These proposals are not unreasonable or impossible to meet. They must be met by one means or another. . . .

Next, there are the plans sponsored in whole by unions or as joint ventures with management. One of these joint programs is the United Mine Workers' Welfare and Retirement Fund. Its annual report shows that almost 56½ million

Grand Lodge representative, International Association of Machinists.

dollars was spent for medical care and hospitalization in the fiscal year which ended last June. The fund plans to have ten hospitals in operation within the next two years. The tremendous cost for benefits, plus the drop in royalty payments owing to the lack of coal sales, resulted in expenditures exceeding income by 7½ million dollars. Despite this deficit, the reserve on hand remains at over 92 million dollars.

The Labor Health Institute of St. Louis, Mo., is a joint program conducted by the local union and some 200 firms in the area. The employee contributes from 3½ per cent to 5 per cent of gross payroll for individual or family coverage. The medical center has been maintained for the past five years and covers 9,000 workers and a majority of their families. It has a full-time medical director and 65 physicians and dentists who practice on a part-time basis. Under this program, the chief emphasis is placed on prevention of sickness instead of treatment. In addition to the payroll deduction, the members pay for drugs, dental material and eyeglasses; all other benefits are provided free of charge.

The third type of program is that which 26 union locals, composing the New York Joint Board of Amalgamated Clothing Workers of America, started in 1944. At first, it was a nation-wide program which provided life insurance, health insurance and retirement coverage, but in 1951, the Sidney Hillman Health Center was opened. Medical care, surgical care, optical and dental examinations are furnished. In these two years, a total of 15,000 persons have received medical services. This number represents almost 47 per cent of the eligible union members, disproving the charge that people in large cities will not go to a central center or to a physician not of their choice.

In general, then, the provisions and standards that labor unions encourage in health service plans are these: (1) The plan should provide service rather than cash benefits. (2) The plan should provide coverage for the entire family. (3) The plan should include preventive, diagnostic and treatment services in the practitioner's office, the health center, home and hospital. (4) The physicians and other health personnel should work as a team in group practice to assure high quality and efficiency. (5) The plan should be democratically administered, with adequate consumer representation on the policy-making board.

As I recall in our joint conference of last April, it was reported that the House of Delegates of the American Dental Association recommended that dental societies inaugurate experimental dental prepayment plans. We of labor stand sincerely ready and willing to assist in any way to make these recommendations a reality.

FACTORS INFLUENCING METHODS OF PROVIDING DENTAL SERVICES FOR MEMBERS OF LABOR UNIONS

Otto W. Brandhorst, D.D.S., St. Louis, Mo.

There are many matters that need to be considered in providing group services, whether they be for labor groups or others. In regard to dental health services, two factors are especially important.

First, dental services, except for such programs as fluoridation of the communal water supply, general direction in home care, and so on, become, for the most part, individual care. The time element, therefore, becomes an important factor.

Secondly, there is the fact that many of the dental disorders—caries and periodontal disturbances—are progressive in nature and seldom self-limiting. In other words, there is an accumulation of neglect that affects the type of service needed.

The two foregoing factors will suffice to point out that there are variables that complicate the approach to group health planning in dentistry. That is why the dental profession has always advocated preventive and control measures and, to make the measures effective, an educational program for the public.

Let us then consider the problem: Our objective is health service for a group of people. Much concern and anxiety can be eliminated if there is full knowledge of the problem.

First, we need to know the oral conditions of the group.

Next, is the service to be available to certain employees only? Are they predominantly male or female? Is there a specific industrial problem or circumstance that affects the oral health of the employee? Will the plan include the employee's dependents?

Another consideration is the method of rendering the service. Is it to be through private offices or in a clinic? And are the facilities and the dental manpower hours now available?

The place that a preventive program is to have in the over-all plan also must be considered. Is the program to be one of repair only, with its never ending demands? Is the plan to give only emergency service, or is the service to be as complete as our dental knowledge at present can make it?

Next comes the question of how the participating dentists are to be paid. By a fee schedule, or on a per capita basis with each participant paying a stipulated amount, regardless of service rendered, or on a salary basis? Or, a combination of any of these three possibilities? The method decided upon will, in turn, determine the manner in which the patient will make his or her payment: whether it is made directly to the dentist or to a fund from which payments to dentists will be made.

Certain alternatives can be summarized as follows: In any health plan, provision will have to be made for dental care to be either complete or partial; to be rendered on an initial cost basis or on a maintenance basis, or both; to be voluntary or compulsory for the participant; to be paid from personal or other funds, or in combination; to be based on present standards, or on changed standards, either lower or higher.

The solution is not an easy one, but the objective should be clear. Through cooperation and understanding it can become a reality.

It is my suggestion, therefore, that the problem of dental health service for the various groups be approached by applying the foregoing questions to the various problems as they arise.

Past president, American Dental Association.

COUNCIL ON DENTAL EDUCATION

Additional hospital dental internships and residencies approved by the Council on Dental Education (supplement 1)

The Council on Dental Education and its Committee on Internships and Residencies, at the meeting held on May 28-29, 1954, voted to approve the educational programs in the hospitals listed in the accompanying table.

Hospital	Type of program approved	Length of program approved (months)	Number of positions available	Date the service begins
CALIFORNIA San Francisco Hospital (University of Calif. Service) Potrero and 22nd San Francisco, California Dr. Melvin J. Sherman, Chief of Dental Service	Internship Oral surgery	12	1	July
GEORGIA Milledgeville State Hospital Milledgeville, Georgia Dr. J. B. Herndon, Chief of Dental Service	Internship Rotating	12	2	July
MASSACHUSETTS Holyoke Hospital 575 Beech Street Holyoke, Massachusetts Dr. Karol B. Zielinski, Chief of Dental Service	Internship Rotating	12	1	July
MINNESOTA Veterans Administration Hospital 54th Street and 48th Avenue, South Minneapolis, Minnesota Dr. Sylvester Koontz, Chief of Dental Service	Residency Oral surgery	12	1	July
NORTH CAROLINA Duke University Hospital Durham, North Carolina Dr. Nicholas G. Georgiade, Chief of Dental Service	Internship Oral surgery	12	1	July or Jan.
	Residency Oral surgery	12	1	July or Jan.
WEST VIRGINIA Wheeling Hospital 109 Main Street Wheeling, West Virginia Dr. C. D. Messerly, Chief of Dental Service	Residency Oral surgery	12	2	July

The following changes have been made in the list of approved internship and residency programs published in the May 1954 issue of THE JOURNAL.

Hospital	Type of program approved	Length of program approved (months)	Number of positions available	Date the service begins
CONNECTICUT				
Hartford Hospital 20 South Hudson Street Hartford, Connecticut Dr. Wilson R. Conran, Chief of Dental Service	Internship Oral surgery	12	1	July
MASSACHUSETTS				
Worcester City Hospital 71 Jaques Avenue Worcester 3, Massachusetts Dr. Leo Berg, Chief of Dental Service	Internship Rotating	12	2	July
NEW JERSEY				
North Hudson Hospital 4300 Park Avenue Weehawken, New Jersey Dr. Morris J. Bayer, Chief of Dental Service	Internship Oral surgery	12	1	July
NEW YORK				
St. Luke's Hospital Morningside Heights New York 25, New York Dr. Malcolm W. Carr, Chief of Dental Service	Internship Oral surgery	12	1	July
PENNSYLVANIA				
St. Francis Hospital 45th Street at Pennsylvania Avenue Pittsburgh, Pennsylvania Dr. R. J. Englert, Chief of Dental Service	Internship Rotating	12	1	Aug.
TENNESSEE				
Knoxville General Hospital Cleveland Place Knoxville 17, Tennessee Dr. Albert C. Harvey, Chief of Dental Service	Internship Oral surgery Residency Oral surgery	12 12	1 1	July —

BUREAU OF ECONOMIC RESEARCH AND STATISTICS

The 1953 survey of dental practice
VII. Summary

The type of information gathered in this survey of dental practice is useful in many ways. The survey results provide indications of efficient and inefficient characteristics of dental practice, which can be used to advantage by the individual dentist. Statistics on income and number of patients, broken down geographically, are of help to the dentist trying to decide where to practice. The type of factual information gathered in this survey is necessary in planning dental health programs. Data regarding the dental profession are often of crucial importance in legislative testimony on bills of interest to the dental profession. The Association frequently is asked to furnish information of the type covered in this survey to many inquiring organizations and individuals.

The questionnaire was sent to every third dentist in the United States of whom about 5,000, or 18 per cent, returned questionnaires, 4,552 of which were usable. Respondents were closely representative of dentists in general with respect to geographic location. They were also satisfactorily representative with respect to age, although there was some overrepresentation of dentists in their thirties and underrepresentation of dentists aged 65 and older. There was a marked underresponse from nonmembers of the Association: 6.5 per cent of the respondents were nonmembers, compared to an estimated 20 per cent among all active dentists.

The mean net income in 1952 for dentists participating in the survey was $10,539. For independent (nonsalaried) dentists the mean was $10,873, compared to $6,920 for salaried dentists. Dentists who practiced in partnerships reported a mean net income of $14,876, 39 per cent higher than the mean for dentists in solo private practice.

The incomes reported by survey participants varied over a wide range. Although the mean was $10,539 and the median $9,502, only 7.4 per cent of the dentists fell into the $10,000 to $11,000 category and only 6.5 fell into the $9,000 to $10,000 category. A total of 15.3 per cent of the respondents reported net incomes under $5,000; 37.1 per cent from $5,000 up to $10,000; 27.6 per cent from $10,000 up to $15,000; 12.7 per cent from $15,000 up to $20,000, and 7.3 from $20,000 up. The standard deviation of net incomes was $6,550, with a coefficient of variation of 62.2.

The mean gross income reported for 1952 by independent dentists was $18,797. Mean net income was 57.8 per cent of mean gross income; in other words, overhead of the average dentist amounted to 42.2 per cent of his gross income.

By multiplying mean gross income by the number of dentists in private practice, and adjusting for underresponse of nonmembers, it is estimated that the national dental bill in 1952 was 1.3 billion dollars, exclusive of philanthropic and governmental dental expenditures. This compares with a U. S. Department of Commerce estimate of $1,028,000,000 for 1952, and a Health Information Foundation estimate of 1.6 billions for the year ending at mid-1953.

Mean net income of independent dentists according to region was highest in the Far West ($13,232), followed by the Southeast ($11,840), the Southwest ($11,317), the Northwest ($10,739), Central ($10,263), New England ($10,-

201), and the Middle East ($9,892). Mean net income according to city size was lowest in places under 1,000 population, reached a peak in cities of 100,000 to 500,000 population, and declined in larger city-size categories. The mean net income in the three largest cities was $9,417.

Independent specialists as a group reported mean net incomes 39 per cent higher than general practitioners. Among the independent specialists, highest net incomes were reported by orthodontists ($16,069) and oral surgeons ($15,727).

Dentists employing one chairside assistant averaged higher incomes than did dentists employing one secretary or receptionist. Dentists who employed two chairside assistants reported higher incomes than did dentists who employed one assistant and one secretary or receptionist.

Net income increased as the number of employees increased despite the fact that overhead, as a percentage of gross income, was higher with additional employees. The mean net income of dentists with two chairs and one assistant was 78 per cent higher than that of dentists with one chair and no employees.

Dentists with x-ray equipment in their offices, and dentists with equipment for administering gas, reported higher incomes than dentists without such equipment. Of the independent dentists responding, 93.7 per cent owned x-ray machines and 16.4 per cent owned equipment for administering gas.

Dentists who worked 47 weeks during 1952 reported higher average incomes than dentists who worked a longer or shorter year. Their mean net income was $12,243 compared to only $9,333 for dentists who worked 52 weeks.

Independent dentists were asked to estimate the percentage of their gross income derived from specified types of dental services. Based on the replies, it was estimated 40 per cent of the total gross income of dentists was received for fillings, 28 per cent for crowns, bridges and dentures, 14 per cent for oral surgery, 6 per cent for periodontal treatment, 5 per cent for orthodontic treatment and 7 per cent for other dental services.

The largest items of expense reported by dentists were salaries paid to employees and commercial prosthetic dental laboratory charges, each of which accounted for nearly one fourth of the average dentist's total expenses. Mean office rent was $990 for the year and amounted to 12.5 per cent of total professional expenses. Mean salaries paid to auxiliary personnel were $2,973 for hygienists, $3,225 for technicians, $2,036 for assistants and $2,030 for secretaries and receptionists. Employment of full-time auxiliary personnel was reported by the following percentages of independent dentists: hygienists, 6.6 per cent; technicians, 3.9 per cent; assistants, 56.5 per cent, and secretaries and receptionists, 15.6 per cent. A total of 73.1 per cent of independent dentists indicated they employed some type of auxiliary personnel for part or all of the year. This percentage varied from a high of 89.0 per cent in the Southwest to a low of 60.6 per cent in the Middle East.

Based on expenses reported by survey participants, it was estimated that in 1952 dentists paid approximately $140,000,000 to commercial dental laboratories and $90,000,000 for dental supplies and drugs. Depreciation figures indicated that the average annual expenditures for equipment during the preceding 10 years came to about $30,000,000.

The mean number of weeks worked in 1952 by independent dentists was 46.9 compared to 42.5 weeks for salaried dentists. Two-week vacations were reported by 28.6 per cent of independent dentists responding, three-week vacations by 15.9 per cent, and four-week vacations by 17.7 per cent. Vacations longer than four weeks were reported by 21.7 per cent,

1. Dublin, Louis I. Facts of life from birth to death. New York, The Macmillan Co., 1951, p. 286.

and 8.9 per cent indicated they took no vacation in 1952.

Approximately half (51.2 per cent) of the respondents stated they were not absent from work because of illness or other disability during 1952, and 33.7 per cent reported absences of from one to seven days. The mean number of days lost owing to illness and other disability was 4.8, which compares with a national average of about eight days per year for male workers.[1]

Dentists were asked to estimate the average number of hours in the office per week in 1952. The means for independent dentists were 34.9 chairside hours, 4.6 laboratory hours, and 3.8 other hours in the office, for a total of 43.3 office hours per week. The work week of the average specialist (39.7 hours) was approximately four hours shorter than the work week of the average general practitioner (43.6 hours). Almost one fourth of the respondents spent 50 hours or more per week in the office. Prosthodontists averaged about 27 per cent of their office time in the laboratory, compared to 11 per cent for all independent dentists.

Independent dentists were asked to estimate how long the average patient was required to wait for an appointment (excluding emergency cases and patients scheduled for a series of treatments). An average wait of less than one week was reported by 34.1 per cent, a wait of one week by 21.6 per cent, two weeks by 17.0 per cent, and more than two weeks by 27.3 per cent.

The question on number of patients treated during the year was a difficult one for most dentists to answer; in fact, it was answered by only about half of the respondents. The mean number of patients reported by independent dentists was 1,012 and the median 724; there was, however, much variation in number of patients reported, with 15.6 per cent reporting fewer than 300 patients and 16.8 per cent reporting 1,600 or more patients.

The mean number of patients in 1952 reported by dentists in the Southeast region was about twice that reported by dentists in the Middle East and almost twice the mean for New England. The ranking of other regions was: Southwest, Northwest, Far West and Central.

The mean number of patient visits was 2,872. By dividing this figure by the mean number of patients it is estimated that the average dental patient made 2.8 visits to the dentist during the year.

The correlation of number of patients with age of the dentist showed that dentists in their fifties reported the most patients. There was a sharp drop in number of patients reported by dentists beyond age 70.

Dentists with one auxiliary employee averaged 53.8 per cent more patients than dentists with no employees; with two employees, the increase was 107.3 per cent, and with three employees, 219.3 per cent. The percentage increase in number of patients with number of employees for an entire year, as determined in this survey, was considerably greater than the increase in number of patients during a week, as determined in the 1950 Survey of the Dental Profession.

Based on the mean number of patients per dentist, it is estimated that about 42 per cent of the population saw the dentist in 1952, compared to 40 per cent in 1949 as estimated from results of the 1950 Survey of the Dental Profession.

Independent dentists were asked to indicate how busy they were in 1952 by checking one of four statements describing different degrees of busyness. A total of 15.4 per cent indicated they did not have as many patients as they would have liked, 44.9 per cent indicated there was a "good balance" between demand and their ability to meet it, and 39.7 per cent indicated they were too busy (either could not accommodate all who requested care or felt overworked). However, "not enough patients" was checked by 26.3 per cent of the dentists in the Middle East and 20.6 per cent of the dentists in

New England. In general, the regional differences in replies to this question were consistent with the regional differences in income and number of patients.

This concludes the series of articles on The 1953 Survey of Dental Practice. A composite reprint of the series will be available about mid-September. Single copies will be sent free on request to the Bureau of Economic Research and Statistics.

B. Duane Moen, Director

BUREAU OF LIBRARY AND INDEXING SERVICE

The American Dental Association Film Library

The following films and slides have been added to the American Dental Association Film Library and are now available at a nominal rental fee of $2.50 for each film and $1.50 for the series of slides. Although the film, "How to Conduct a Discussion," does not specifically relate to dentistry, the principles illustrated should assist dental society committee chairmen, hospital dental committees, dental assistants' and dental hygienists' committee chairmen in developing dynamic discussions at their meetings.

The film, "Inside Story," and the slides, "How the Royal Family Learned to be Happy," have been cleared for television. For use on a specific telecast, however, permission must be obtained again from their producers noted in the information accompanying their descriptions. When the film, "Inside Story," is shown before nonprofessional audiences, a dentist should be present to answer questions.

FILMS RECEIVED

How to Conduct a Discussion • 16 mm., black and white, sound, 24 min. Produced in 1952 by Encyclopedia Britannica Films, Inc. Procurable on loan ($2.50) from the American Dental Association Film Library, 222 E. Superior St., Chicago, and on loan or purchase ($112.50, including reel and can) from Encyclopedia Britannica Films, Inc., 1150 Wilmette Ave., Wilmette, Ill.

Technics for training discussion leaders are demonstrated. (Suitable for dental societies, dental study clubs, schools, community and civic groups and other professional and nonprofessional groups.)

Inside Story • 16 mm., color, sound, 15 min. Produced in 1950 with revisions in 1954, by Forrest R. Slavens, D.D.S. Photography by Rainbow Pictures. Procurable on loan ($2.50) from the American Dental Association Film Library, 222 E. Superior St., Chicago, and on purchase ($130) from Dr. Slavens, Steamboat Springs, Colo.

This public health education film explains and illustrates the importance and the various uses of the roentgenogram in dental practice. (Suitable for PTA's, community and civic groups and dental practitioners.)

How the Royal Family Learned to be Happy • 2x2 slides, color, 50, with record, study guide and script. Produced in 1953-54 by Mrs. Margaret Louise Bish. Procurable on loan ($1.50) from the American Dental Association Film Library, 222 E. Superior St., Chicago, and on purchase ($55) from Mrs. Bish, 527 E. Orange Grove Ave., Sierra Madre, Calif.

Proper nutrition, good dental care and correct toothbrushing are illustrated in this fairy story. (Suitable for preschool children and for those in lower primary grades.)

COUNCIL ON LEGISLATION

Dentists and OASI

The following testimony was presented to the Senate Finance Committee on July 6, 1954, by J. Claude Earnest of Monroe, La., vice-chairman of the Council on Legislation. Dr. Earnest was accompanied by Francis J. Garvey, the Council secretary.

I am J. Claude Earnest, a self-employed practicing dentist of Monroe, La. I am here today to present the views of the American Dental Association with respect to H.R. 9366. In presenting these views, I believe that I can speak with considerable knowledge of the attitude of dentists toward inclusion under OASI for not only am I a self-employed dentist myself but I am also vice-chairman of the Association's Council on Legislation and a member of its House of Delegates. Both personally and officially, I have had a good deal of experience with the discussions leading to the Association's position in this matter. I might also state that I am a member of the Executive Council of the Louisiana State Dental Society, and that the position of the dentists in my state is identical to that of the American Dental Association.

As a preliminary remark let me say that Old Age and Survivors' Insurance is based on assumptions that do not necessarily obtain in professional groups in that it is designed to assist those whose economic conditions are vastly different from those found in a profession. This I will illustrate later in my testimony. Professional persons are self-employed and self-determining and are not limited by the economic considerations which compel retirement at age 65 in general industrial employment.

It appears to us that there are two fundamental questions before the committee today: (a) Is the OASI system to be one of universal coverage? (b) If not, what groups should be excluded from its application?

Upon examining the bill before you today, together with the existing law which will not be affected by that bill, we find that the first question is clearly answered by the fact that certain groups, both employed and self-employed, will continue to be excluded. In the first place, there are still a number of types of excluded employment including service as a member of Congress. In the second place, by determination of the House of Representatives, a self-employed group, physicians, is excluded.

Since it is clear that OASI is not to be a system of universal coverage, there remains for determination only which groups are to be excluded. The House has determined already that physicians constitute a proper group for exclusion and with this we agree. We submit that self-employed dentists likewise constitute a proper group for exclusion and this we will demonstrate. Accepting as valid the points made in the House of Representatives in favor of the exclusion of physicians, let us examine the debate in that body to see what reasons were advanced for including dentists.

At page 7021 of the June 1st *Congressional Record* (and all citations will be to the record of that day) it was said:

"It was also pointed out that in the case of physicians they do not retire at age 65. They continue working, therefore they did not think it would be fair for them to be required to pay the tax when they did not expect to retire and get benefits. *On the other hand, some evidence was presented that the dentists being on their feet and working at their chairs, it frequently resulted in their having to retire at an earlier age than physicians.*" (Emphasis supplied.)

I have carefully read all of the Hearings before the House and I do not find that this latter contention is borne out. As a matter of fact, in testifying for the American Dental Association, I used the following language:

"Except in unusual cases, dentists continue working throughout their lives. Since they cannot continue to work and simultaneously derive benefits from their contributions to this scheme, they prefer to be omitted from it so they can invest their funds in retirement plans of their own choice from which they will receive at least the return of their investment."

I, personally, know many dentists who are still in practice after 50 or more years and, since the average age of dentists at graduation is 26 years, these men must be over 75 years of age. To confirm my own information, how-

ever, I requested a statement from the Bureau of Economic Research and Statistics of the American Dental Association which keeps careful track of such matters. It reported as follows:

"It is estimated that the mean age of retirement for dentists is between 68 and 70 years and probably closer to 70. There are more than 8,000 dentists, or approximately ten per cent of the profession, between the ages of 65 and 75 years, the majority of whom are still in practice."

The Bureau accompanied its statement with a table of the age distribution of dentists 65 and over. As you will note from that tabulation which is included for your convenience, there are approximately 12,000 dentists, now living, who are 65 or more.

Age	*Living*	*Age*	*Living*	*Age*	*Living*
65	1,061	70	794	75	609
66	1,000	71	780	76	547
67	925	72	739	77	478
68	865	73	694	78	428
69	807	74	689	79	354
				80 and over	1,209
				Total	11,979

Since the Bureau has arrangements with the various State Departments of Vital Statistics to furnish it with copies of the death certificates of dentists, and since we know the age distribution of dentists, by checking the two lists against each other, the Association can keep track readily of the ages of living dentists.

The point is substantiated by quoting from a letter from a Colorado dentist to the Council on Legislation dated June 16, 1954, protesting against the inclusion of dentists in OASI. He said:

"Dentists do not retire—a few move their offices to their homes and have a net income far beyond $1,000. I am the only Denver dentist I know who is really retired. I closed my office last January at age 81. Dentists should have been cut out when physicians were eliminated from Social Security."

A further reason given for excluding physicians is found in the statement at page 7031 of the *Record:*

"It would be a rare experience for a doctor (physician) even in his late years to have an income of $1,000 or less. Therefore they would be paying social security tax with no chance in most instances of ever receiving any return from it."

If this is part of the reason for excluding physicians while including dentists I would like to submit income figures on income derived from dental practice by dentists aged 65 and over. According to the "1953 Survey of Dental Practice" conducted by the Association's Bureau of Economic Research and Statistics, average annual net incomes of self-employed dentists from the practice of dentistry, in the upper age groups were as follows:

Age	
65-69	$7,192
70-74	5,842
75	2,975

Certainly few dentists will retire to live on social security benefits of $1,296 per year if they are physically able to produce an income such as that listed, nor will they ordinarily retire on the maximum benefit of $1,944, including the wife's portion, should she be the same age as the dentist, when even at age 75 they can exceed the dual benefit by more than $1,000.

These income figures are important, not only because they indicate income from the practice of dentistry well above Social Security benefits, but also because they prove conclusively that dentists in the senior age groups do continue to work and to produce incomes which make them self-supporting. This income can be understood more readily if one realizes that dentists tend to concentrate their practice on patients in their own age group. These patients tend to remain with the dentist and, in the later years of both patient and dentist, require more prosthetic work than any other type of dental treatment. Since this work is not nearly so fatiguing physically as general operative dentistry, it is possible for dentists to continue working until relatively late in life. In this connection it should be noted that the 1953 Survey of Dental Practice revealed that the average working year of all self-employed dentists averaged 46.9 weeks for all age groups. The working year for the 65-69 age group was 45.5 weeks, for the 70-74 age group, 46.4 weeks and for the over 75 age group, 45.1 weeks.

Reverting to the statement quoted earlier that dentists retire earlier because they are on their feet more than physicians, I think that the Committee should be informed that this hazard has been considerably reduced by the conditions of present day practice with modern equipment, offices designed for maximum convenience, and the growing use of auxiliary personnel to relieve the dentist of much of the

nervous strain and physical effort formerly associated with the practice of dentistry. The effectiveness of these modern conditions of dental practice is established by the figures which I have quoted showing the number of practicing dentists over age 65 and the earning power of such dentists.

The Association believes that the Committee will want to consider another important factor. It is well recognized that the oral health condition of the American people is such that a continuing large supply of dentists is needed. The consensus among those who have studied the problem is that there is no surplus of dentists today. The defense needs of the country, for example, require the services of some 6,000 younger dentists. Assuming, for the sake of argument only, that the inclusion of self-employed dentists in OASI with its proposed benefit structure might encourage a substantial number of dentists to retire at age 65, to that extent the requirements of the people of this country for dental health service would suffer.

We are presently producing about 3,000 new dentists each year with a resultant net increase of about 1,100 over deaths and retirements. The vast majority of these new dentists are siphoned into military service for two years shortly after graduation. To encourage the retirement of dentists at age 65 would be to lose the services of a great number of dentists fully capable of maintaining active practice and, since the median age of all dentists is about 46.68 years, the resultant loss over the next 15 years could not be made up by new graduates for a long time to come.

The dilemma presented to Congress if dentists are included in OASI is this: if the benefits are sufficient to encourage dentists to retire the health care of the people will suffer; if the benefits are not sufficient, then the dentists of the country will be required to pay the costs of a program from which they cannot derive benefits.

At page 7024 of the *Record* it was said:

"But why did we not take dentists out? I would have taken them out too. I am willing to take them out. But you cannot take everybody out and make the system work. Somebody has got to be in it *and somebody has got to pay in order to make this go . . .*" (Emphasis supplied.)

Clearly this is a recognition that OASI is not the insurance system it is alleged to be, but rather a tax-raising device to which all must contribute in order that some may benefit. If this be true, and the difference between the solvency of the system and bankruptcy is the anticipated contributions of 83,000 dentists, then any reasonable observer must say that the financial structure of the entire OASI is already in a precarious condition, and the inclusion or exclusion of the contributions of this relatively small number of the total population will not save it.

In 1949, the American Dental Association, through its House of Delegates, adopted a policy which opposes the inclusion of self-employed dentists in Old Age and Survivors' Insurance. On three later occasions the question of changing that policy has been on the agenda of the meeting and each time it has been voted down, most recently in 1953 by a vote of 312 to 64.

The House of Delegates is the democratically-elected group which establishes Association policy. Its more than 400 members are elected to membership for terms of from one to five years, according to the wishes of the particular state from which they come. They represent what we call constituent societies which are located in every state and territory except Guam and the Virgin Islands. They represent also more than 400 component or local dental societies. If a delegate does not properly represent his constituents, he probably will not be returned to the House. Yet in the past five years we have heard of no delegates who have been defeated because they voted that dentists should be excluded from OASI.

The House of Delegates functions in a manner similar to Congress. Matters can come before it by recommendation of the Association's Councils, by resolutions adopted by state societies or by resolutions introduced by individual members of the House. Any matter before the House of Delegates is referred to a Reference Committee which operates like a Committee of Congress. On the subject of OASI, well-publicized public hearings by Reference Committees were held in three separate years. These were attended by large numbers of dentists, both delegates and general members who expressed their views. In 1951 the Association distributed to dental societies throughout the country complete information kits telling both sides of the OASI story. After all these years of study and discussion, the Association continues to maintain its position that dentists should be excluded.

I said earlier that the House of Representatives, in the bill now before you, had accepted the principle that universal coverage is not necessary. What better way to determine which groups should be excluded than to accept the policy of the official organizations of groups which desire exclusion? If there are exceptions to be made, it certainly seems reasonable that the judgment of the affected

group should be accepted by the Congress rather than to have the Congress paternalistically determine that its judgment of what is best for the group should be substituted for what the group itself desires.

In conclusion, may I recall to your minds that 178 years and two days ago the Founding Fathers signed the Declaration of Independence in which they set out as one of their grievances against George III:

"For imposing taxes upon us without our consent."

May I respectfully request that this item of the grievance of our forefathers be not imposed upon the dentists of today, and that instead H.R. 9366 be amended to exclude the self-employed dentists from coverage under the Old Age and Survivors' Insurance system.

COUNCIL ON DENTAL RESEARCH

Additions to List of Certified Dental Materials

Since the publication of the most recently revised list (revised to November 15, 1953) the following materials which conform to American Dental Association Specification No. 1 for Amalgam Alloy have been added.

CERTIFIED AMALGAM ALLOYS
(A.D.A. SPECIFICATION NO. 1)

Alloy	*Manufacturer or distributor*
Abner Oxford Alloy	Abner Alloys Co.
Minimax 178, Filings, Non-Zinc	The Minimax Co.

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Editorials

Quadrupled expenditure for dental service reflects greater regard for dental health

America's dental health bill in 1952, according to three recent estimates, amounted to well over one billion dollars. At first glance this sum seems to indicate either that the nation's dental health is in a highly deplorable condition or that the dental service the nation receives is ample. Actually it indicates neither. It merely indicates that 153,360,000 people spent an average of about $8.50 each for dental service during 1952. Whether that sum was sufficient for the nation's needs is open to question.

The Bureau of Economic Research and Statistics[1] of the Association, basing its findings on results obtained from a mail survey of dentists, estimates the nation's 1952 dental bill at one billion, three hundred million dollars. The United States Department of Commerce[2] estimates, from information supplied by dentists, that the nation's dental bill was one billion, twenty-eight million dollars. The Health Information Foundation,[3] basing its figures on data obtained through interviews with 2,809 representative families, concluded that the bill amounted to $33 per family or approximately one billion, six hundred million dollars for the year ending July 1953—some six hundred million more than the estimate of the U.S. Department of Commerce and three hundred million more than the estimate of the Bureau of Economic Research and Statistics.

A spread of such magnitude rightfully raises some questions, but when the three estimates are broken down from a national to a per capita basis, the differential may be rationalized. On the latter basis the average for all America according to the estimates of the U.S. Department of Commerce was $6.70. According to the Bureau of Economic Research and Statistics it was $8.48, and according to the Health Information Foundation it was $10.33. A difference in the listing of one minor operation

could easily account for the difference between the lowest and highest estimates. Of course, not everyone in the United States receives dental care regularly. The Bureau estimates that 42 per cent of the population received dental care during 1952. Therefore, the average expenditure for dental service by those who availed themselves of such services was between $16 and $24.50 per person. Certainly none of these sums seems adequate in view of the prevalence of dental disease and the size of the dental problem.

Nor would the sums seem adequate when compared to sums which Americans choose to spend for less essential items. According to the Department of Commerce,[2] America's annual alcoholic beverage bill is 8.6 times as large as its dental bill. The nation spends 11.4 times as much for recreation and 5 times as much for tobacco and smoking supplies as it does for dental service. In 1952 the American public spent approximately one billion, six hundred million dollars for candy and other confectionery products,[4] which equals the amount that the Health Information Foundation estimates was spent during that same period for dental care.

Lest the pessimistic reader bemoan too greatly the nation's apparent lack of interest in dental health, pertinent data for 1929 and 1952 should be compared.[5] In 1929, a year often referred to as representing a pinnacle in the nation's prosperity, America spent four hundred and eighty-two million dollars for dental care or $3.96 per person. By 1933, the national dental bill had dropped to two hundred and seventy-six million dollars or $2.20 per person. From a quarter of a billion dollars in 1933 to more than a billion and a quarter in 1952, or from an average dental expenditure of $2.20 per person to $8.48 per person in twenty years, speaks well for America's mounting appreciation of dental health. If this appreciation continues to mount at the same rate in the future, a high standard of dental health for American posterity seems assured.

1. Bureau of Economic Research and Statistics, American Dental Association. The 1953 survey of dental practice. VII: Summary. J.A.D.A. 49:221 Aug. 1954.

2. U. S. Department of Commerce. Survey of current business, July 1953. Washington, D. C., Government Printing Office, p. 22.

3. Anderson, O. W. National family survey of medical costs and voluntary health insurance. New York, Health Information Foundation, 1954, p. 34-35.

4. Candy and confectionery sales in the United States, 1952. New York, National Association of Tobacco Distributors, 1953, p. 1.

5. U. S. Department of Commerce. Survey of current business, national income supplement, 1951. Washington, D. C., Government Printing Office, p. 194-195.

Football's dental injuries: another problem for the dentist

Beginning in about thirty days and continuing for at least the next three months, the attention of America's sport fans will be focused on the comings and goings and doings of the nation's growing army of gridiron warriors.

Fast becoming the nation's most popular outdoor sport, football is essentially a game of bodily contact between players—one that is bound to produce numerous bodily injuries, particularly to the young unskilled high school player. Heading the list of such injuries are those with which the dentist is particularly concerned—

injuries of the teeth, jaws and adjacent parts. According to the National Federation of State High School Athletic Associations,[1] 53.9 per cent of high school football injuries in 1952-53 concerned the face and mouth. Anterior teeth are particularly susceptible. The California Interscholastic Federation[2] reports that for the 1952-53 season 162 high school football players injured one anterior tooth, 61 injured two, three injured three and eight injured more than three. More serious, perhaps, than injuries to the teeth are injuries to the mental and nervous system resulting from concussions received during play.

Although the high school contestant is particularly liable to such injuries, the more mature and experienced college player is by no means immune. A survey of 62 colleges made in 1950 under the auspices of the University of Missouri[1] shows that dental injuries ranked first among football accidents, with 733 teeth lost or injured by 4,000 college athletes that year.

Many of these injuries could have been prevented had the contestants worn mouth protectors similar to those worn by boxers. The benefits to be derived from such protectors have been cited on numerous occasions. One of the latest reports on the subject was published in last month's issue of THE JOURNAL. Watts, Woolard and Singer[3] provided twenty-six members of a Chicago high school football team with mouth protectors which the youthful contestants were required to wear during play. The team had already incurred four dental injuries before the protectors became available. After they became required equipment, dental injuries to the team were reduced 100 per cent, whereas opposing teams in the same games suffered an average of two injuries in and about the mouth.

In view of the mounting incidence of such injuries, dental societies as well as individual dentists might well assume more responsibility for their prevention. If every dental society would call this serious situation to the attention of athletic officials in their communities, mouth protectors soon would become a required part of the football player's armament, thousands of dental cripples would be prevented and dentistry would render another service to society.

1. Cathcart, Jack F. Football's ounce of prevention. J. Am. Assoc. for Health, Physical Education and Recreation 28:4 Oct. 1953.
2. Ingham, A. B., executive secretary, California Interscholastic Federation. Unpublished report.
3. Watts, George; Woolard, Archie, and Singer, Carl E. Functional mouth protectors for contact sports. J.A.D.A. 49:7 July 1954.

Success of accident and health insurance program now practically assured

Have you protected your family with adequate accident and health insurance? If not, now is the time to do so at exceptionally low cost. This opportunity is made possible by a decision of the Council on Insurance to extend the second enrollment period for the Association's accident and health insurance program to September 15. The extra few weeks should give the Council sufficient time to enroll an additional one thousand applicants—more than are needed for the program to meet its required national quota.

The extension is welcome news, particularly to those who have neglected to provide a favorable amount of accident and health insurance for their families, as it gives them an opportunity either to initiate an insurance program or to supplement the protection they now have. The extension also is welcomed by the several hundred members who, because of their unfavorable physical condition, have not been able to obtain such insurance. As soon as the additional applications are obtained and the project meets its national quota, these members who have applied can be included in the program.

One of the fundamentals of the plan is that in order to be fully effective on a national scale and to cover the physically impaired applicants as well as the physically fit, at least 50 per cent of Association members must file applications. The same fundamental applies on a state basis—that is, in order for the physically impaired applicant to be accepted, at least 50 per cent of the state society members must have filed applications. Other details of the plan are published on page 235 of this issue.

The Council on Insurance, aided by the state insurance committees, is to be congratulated on its heroic efforts to make this practical and inexpensive program available. Twenty-eight of the 54 constituent dental societies have reached their quotas and four others are nearly over the top. As of July 19, Vermont needed but three more applicants; New Hampshire needed seven; Kansas required ten and West Virginia eleven. It is inconceivable that these four states, so near their goal, will not close the gap between failure and success by September 15. In fact, it is inconceivable that an Association of 67,447 active members will not be able, within the next 45 days, to convince at least a thousand additional dentists of the benefits of the program.

One way for this educational campaign to be brought to an early and successful conclusion is for each member now enrolled to enroll a fellow practitioner. It is not necessary for a member to apply for a large policy—a small one, for the purposes of this enrollment campaign, is equally effective. The important point is to secure the needed thousand applications before the period closes so that (1) the family of every member may have some protection against the hazards of accident and illness, (2) the present physically impaired applicants can be included in the program and (3) the program itself can be made a permanent service of the Association to its members.

Washington News Letter

The closing weeks of the 83rd Congress witnessed further demonstration by the Eisenhower Administration of its militant interest in national health legislation. At this writing, it is impossible to tell what Congress will do about reinsurance and the Social Security coverage of self-employed professionals, two of the major issues still confronting Capitol Hill immediately prior to adjournment. But it seems certain that if Congressional action goes counter to the President's recommendations, he will try again when a new national legislature convenes next January.

In mid-July, the Administration suffered setbacks when the House sent back to committee the bill providing for federal reinsurance of health care prepayment plans and the Senate Finance Committee rejected compulsory Social Security coverage of physicians and dentists. Nevertheless, the Secretary of Health, Education and Welfare, Mrs. Oveta Culp Hobby, showed every sign of pressing forward to gain both objectives. In her fight, she had the strong support of President Eisenhower.

Out of this tussling between the executive and legislative branches of government, at least one indisputable fact has emerged. It is that the members of Congress are highly responsive to the views expressed on pending legislation by the organized dental and medical professions.

FUNDS FOR DENTISTRY

An interesting sidelight on health legislation events is the recent Congressional action on U.S. Public Health Service appropriations for the fiscal year beginning July 1, 1954. The incident is one that should give encouragement to those who for years have been striving for federal financial support of dental health activities commensurate with the problem and with the support given other health projects.

What happened was that Congress approved $250,000 more for USPHS dental health programs than was recommended by the Budget Bureau, which is part of the President's office. It is common for Bureau estimates to be pared, but rare for them to be increased by Congress. In the past, dental items in the annual budget have been trimmed almost invariably. When Senate and House conferees met a few weeks ago to settle differences over budget figures, they compromised on all but one of the items pertaining to support of research and public health assistance. The exception was dental health activities, a category which embraces the operation of the National Dental Research Institute, fellowships, fluoridation activities and other measures. On this, the House conferees yielded completely to the Senate action in raising the sum to $1,990,000—a quarter million over the Administration's request.

That is a small figure, compared with the approximately 85 million dollars that was approved for the National Institutes of Health, of which dental research is a unit. There is significance, nevertheless, in the action of Congress in overruling the White House to the tune of a 15 per cent increase.

Issues to be carried over into the new Congress in 1955 include medical and dental care benefits for dependents of servicemen, Department of Defense proposals for inauguration of scholarship programs designed to strengthen the military medical and dental corps and the continuing problems incidental to health care and hospitalization of veterans.

On June 24, the House Veterans Com-

mittee concluded hearings on proposed restrictions on outpatient dental care, but it was held unlikely that any conclusive action would be taken before adjournment. Early in July, however, Congress did complete action on a bill that would exempt Spanish War veterans from existing rules which require prospective beneficiaries to submit proof of service-connection before certification is granted for outpatient dental care.

Then on July 12, a new bill was introduced by Rep. Peter Frelinghuysen (R. N.J.) for the purpose of codifying policy. Under its provisions, outpatient dental care would have to be applied for within one year following discharge or by December 31, 1954, whichever is later, and such care would be on "a one-time completion basis only, unless the services rendered on a one-time basis are found unacceptable within the limitations of good professional standards, in which event such additional limited services may be afforded as are required to complete professionally acceptable treatment."

A legislative rider in the current year's appropriation for the Veterans Administration provides for the December 31 cutoff date already mentioned. In contrast with the Frelinghuysen bill, however, this is temporary legislation. As for the matter of "one-time service," this policy is now being followed on a regulatory basis. The Frelinghuysen plan would make it statutory.

THE DENTIST DRAFT

The Department of Defense is attempting to relieve the anxiety of dentists in their late 30's and 40's who fear they are in the shadow of induction. A great many of them throughout the country have been ordered by their local draft boards in recent weeks to undergo classification processing, including physical examination. This has given rise to the thought, in numerous instances, that induction into the Armed Forces was imminent.

The Defense Department gives reassurance, however, that it has no intention of placing any calls to Selective Service to supply dentists in the upper age groups at any time in the foreseeable future. Selective Service has an age ceiling on processing of physicians but no corresponding ceiling on processing of dentists. As a result, many Priority III dentists in their late 40's have been called up recently for physical examinations but it appears that future calls under the doctor-draft law will affect only those registrants remaining in Priorities I and II and the younger dentists in Priority III.

Association Affairs

INSURANCE PLAN ENROLLMENT EXTENDED TO SEPTEMBER 15

Extension to September 15 of the enrollment period for the Association's insurance program was announced July 15 by Paul Zillmann, insurance trustee. The extension was made because the program is less than 1,000 short of the number needed to permit the coverage of impaired risks throughout the nation. An average of 25 additional applications from each state dental society is needed to put the program in full operation.

Dr. Zillmann reported that as of June 30, 28 constituent societies had met their quotas, thus making eligible the members within their states regardless of previous medical histories. In these societies, all additional members who apply for insurance, including the impaired risks, will be counted towards the national quota.

The Association plan insures the dentist against disability and inability to practice, as well as against accidental death or injury. Because of the group buying power of the Association, the insurance protection is available at a cost of from 35 to 50 per cent less than that of any comparable insurance secured on an individual basis.

Dentists up to age 70 may apply, and the insurance remains in effect for those dentists who continue practicing regardless of age. If the national quota is reached, dentists with poor medical histories will receive a maximum coverage of $200 a month. Applicants with poor medical histories within a given state are covered if half of the state society membership file applications.

Several societies are only a few short of their quota. These are Vermont, short 3; New Hampshire, short 7; Kansas, short 10; West Virginia, short 11, and Connecticut, short 18.

Societies which had reached their quotas were Alabama, Arizona, Delaware, Florida, Hawaii, Idaho, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Mississippi, Montana, New Mexico, North Carolina, North Dakota, Puerto Rico, Rhode Island, South Dakota, Virginia and Wyoming. Previously covered by the same insurance company are California, New Jersey, New York, Nevada and Utah.

Application blanks for the insurance program may be obtained from M. A. Gesner, Inc., 150 E. Superior St., Chicago 11.

STATE SOCIETY OFFICERS TO MEET IN MIAMI

A panel discussion on the dentist's responsibility in atomic bomb disaster will be a feature of the conference of state society officers scheduled for November 7 at the Biscayne Terrace Hotel in Miami, Fla. The conference will precede by one day the Association's 95th annual session.

Moderating the discussion will be John R. Abel, chairman of the committee on civil defense of the Association. Participants will be Gerald M. McDonnel, M.D., of the radiology service at Walter Reed Hospital; Russell W. Sumnicht of Walter Reed Army Medical Center, and Frank B. Berry, M.D., Assistant Secretary of Defense for Health and Medical Affairs.

The state society officers will discuss the operation of Association programs at the state level and the question of what constituent societies should do about Association student members. In addi-

tion, the conferees will hear from John E. Fauber, chief of dental services of the Veterans Administration, on the outpatient dental program of the VA.

The conference will be presided over by Bernard N. Walker, Conference president, and president of the North Carolina Dental Society. Other participants in the program will be announced at a later date.

A.D.A. MEMBERSHIP 80,691, TOPS 1953 RECORD

Membership in the American Dental Association continued its upward climb to reach a new high on June 30 with a record of 80,691 members. The June total was 564 higher than the 1953 year-end figure. The 1953 figure was higher than that for the year before.

Included in the June 30 total were 67,447 active members, 3,370 life members and 9,679 student members, all totals higher than the 1953 totals. Largest increases in active membership were registered in California, Southern California, Maryland, Michigan, Ohio, Oregon, Tennessee, Texas, Wisconsin and the Navy.

RELIEF FUND REACHES RECORD HIGH OF $105,996

A total of $105,996 had been contributed to the 1953-54 Association Relief Fund as the campaign closed July 1. The total set a new record and marked the second consecutive year that the $100,000 goal was surpassed. The Council on Relief announced that 39 societies had topped the 100 per cent mark and that five societies, Alaska, Tennessee, Alabama, the District of Columbia and Idaho, had more than doubled their quota.

The smaller societies did better on a per capita basis than the larger ones, contributing 122 per cent of quota to the 102.8 per cent of the larger groups. Among the smaller societies Alaska led with 453 per cent. Tennessee led the larger societies, turning in 301.6 per cent of its goal. Only ten societies contributed less than 90 per cent of quota.

APTITUDE TEST APPLICATIONS DUE BY SEPTEMBER 17

The first dental aptitude testing session for applicants to the 1955 freshman dental school classes will be held October 1 and 2, and completed application forms must be submitted to the Division of Educational Measurements before September 17, the Council on Dental Education announced recently. Application blanks are obtained from any of the dental schools and from the Division of Educational Measurements in the Association's Central Office.

SENATE COMMITTEE EXCLUDES DENTISTS FROM OASI

On July 19, the Senate Finance Committee voted to exclude dentists and other self-employed groups from Social Security coverage. This was a change from the action of July 13, at which time the Committee had decided to place coverage of self-employed groups on an elective basis. Spokesmen for the Committee said the change was made because of doubt as to whether the voluntary system could be administered. The July 19 decision is in line with Association recommendations. Association views against inclusion of dentists had been presented earlier to both House and Senate committees by J. Claude Earnest and E. Harold Gale, of the Council on Legislation. (For testimony see page 225.)

Health legislation passed by both houses and signed by the President included the "Little Hill-Burton Bill" and appropriations for the United States Public Health Service. Included in the USPHS budget is $1,990,000 for dental

activities, an increase of $250,000 over the last budget.

The expanded Hill-Burton hospital construction program authorizes a three year federal-state program to build chronic disease hospitals, nursing homes, rehabilitation facilities and medical and dental diagnostic and treatment centers. In line with a suggestion made by the Association, the wording of the original bill was changed to insure the inclusion of dental facilities in the definition of diagnostic and treatment centers. The Administration asked for $37,400,000 for the first year of the new law's operation, but the House Appropriations Committee July 16 approved only 2 million dollars.

The President signed into law also the Veterans Administration budget, which contains $11,200,000 for fee-basis, outpatient dental care. Attached to the bill is a rider which provides that veterans must apply for care within one year after service discharge or by the end of 1954, whichever date is later. In addition, treatment is limited to a single series for a proved service-connected disability. A new bill, H.R. 9866, which would make these limitations permanent, was being studied at presstime by the House Veterans Affairs Committee. The only group of veterans exempted from the restrictions of the rider are the Spanish War veterans. On July 15, the President signed H.R. 6412 to exempt them from the eligibility restrictions.

The amendment to the doctor-draft law, permitting the utilization in a professional capacity—but as enlisted men—those physicians and dentists who do not qualify for commissions, also cleared the White House desk. At presstime a House-Senate conference committee was studying H.R. 303, which would transfer the Indian Health Service from the Department of Interior to the USPHS.

The health reinsurance plan was returned to committee by the House of Representatives July 13, a move designed to kill it. The Senate version, however, was reported out of committee to the full Senate.

Reported favorably by the Senate Finance Committee was a bill to extend the unemployment insurance system to employers of four or more persons. The bill was passed previously by the House.

BUREAU PREPARES "FACTS AND FABLES" TV SCRIPT

"Facts and Fables about Dental Health," a 15-minute television script prepared by the Bureau of Public Information, may now be obtained from the Bureau by constituent and component societies. The script features four local dentists who tell the public in simple language some of the fables and some of the facts of dental health.

The dentists deal with such mistaken ideas as the old wives' tale that for every pregnancy the mother loses one tooth, and the false belief that the care of deciduous teeth is unimportant. They explain the importance of diet to dental health, the basic rules of oral hygiene and the value of fluoridation.

TROUBLESOME TERMS TO BE SEPTEMBER WORKSHOP TOPIC

The nomenclature conference sponsored by the Bureau of Library and Indexing Service of the Association, scheduled for September 3 and 4, will deal with terms in the dental vocabulary which have given the dentist trouble over a period of years. Several workshop committees will study these terms under the leadership of well-known dental scientists in various fields.

Kenneth A. Easlick of the University of Michigan will direct the review of terms used to designate the various branches and specialties of dentistry. Harry Sicher, representing the fields of anatomy and physiology, will lead the attempt

to harmonize the terminology of dentistry with that of comparative anatomy and anthropology. Thomas D. Speidel will direct the committee considering some uncertain terms regarding occlusion and malocclusion.

The committees dealing with prosthodontics will attempt to untangle some of the difficulties of definition and language usage in bridgework and complete dentures. Chairmen will be Stanley D. Tylman of the University of Illinois and Carl O. Boucher of Ohio State University. Problems concerning caries terminology will be discussed by a committee of which Gerald J. Cox of the University of Pittsburgh will be chairman, and problems of periodontal and other pathological terminology will fall to a committee headed by Frank J. Orland of Zoller Memorial Clinic.

The conference will be conducted by George B. Denton, research consultant of the Association. Persons interested in participating in this conference may write to Donald Washburn, director of the Bureau of Library and Indexing Service, at the Central Office.

COUNCIL ASSISTS GOVERNMENT IN COLLECTION OF DATA

The Council on Dental Education will assist the National Health Resources Advisory Committee of the Office of Defense Mobilization in the collection of data about dental school faculty members.

The information will enable the Office of Defense Mobilization to judge the needs of the dental schools for faculty personnel and to determine the essentiality for deferment of individual faculty members. In addition, the information will help the Council maintain an up-to-date record of the faculty members in the various schools.

It was reported that nearly all of the dental school deans have expressed interest in receiving the results of a survey conducted by the Council to determine the cost to the dental student and student dental hygienist of dental education. The survey, which is being conducted with the assistance of the United States Public Health Service, will be of assistance to the various agencies which are concerned with the granting of scholarships and fellowships.

TRENDLEY DEAN APPOINTED TO NATIONAL RESEARCH COUNCIL

H. Trendley Dean, secretary of the Council on Dental Research, has been appointed a member of the National Research Council to represent the American Dental Association in the Division of Medical Sciences for a three year period which began July 1. He succeeds Paul C. Kitchin.

A former director of the National Institute of Dental Research of the USPHS, Dr. Dean is credited with directing most of the USPHS basic research on fluoridation. Recently he was among scientists who testified against the Wier antifluoridation bill before the House Interstate and Foreign Commerce Committee.

Dr. Dean has received many honors, including the Gorgas Medal and Award of the Association of Military Surgeons, the John M. Goodell Prize of the American Water Works Association, the Jarvie Fellowship Medal of the Dental Society of the State of New York and the Lasker Award of the American Public Health Association.

CUBAN DENTISTS PLAN TOUR FOR A.D.A. MIAMI DELEGATES

An invitation to Association delegates to visit Havana, Cuba, has been issued by the Colegio Estomatológico Nacional. The Cuban Dental Society has planned a tour of Havana from November 12-16, to follow the Association's 95th annual session in Miami. The tour will coincide

A tour of Vizcaya, the James Deering estate, will take place during the Association's 95th annual session scheduled for November 8-11 in Miami, Fla. The 69-room 16th century palace is filled with European art treasures and is surrounded by 30 acres of garden and woodland.

with the opening session of the fourth national convention of the Cuban group, and Association members are welcome to attend the convention as well. Reservations for housing in Cuba may be made to Antonio Montero, Housing Bureau, Colegio Estomatológico Nacional, Edificio Retiro Odontológico, Vedado, Habana, Cuba.

DENTISTRY CONSULTANTS APPOINTED FOR TASK FORCE

Three Association members have been appointed special consultants to the medical services task force of the Hoover Commission on Governmental Reorganization. They are Rudolph H. Friedrich, chairman of the Council on Federal Dental Services; Leo J. Schoeny, dentist member of the Health Resources Advisory Committee of the Office of Defense Mobilization, and James P. Hollers, alternate member of the Advisory Council to the Assistant Secretary of Defense for Health and Medical Affairs. Appointed staff consultants were Francis J. Garvey, secretary of the Association Council on Legislation and Bernard J. Conway, secretary of the Council on Federal Dental Services.

The consultants held their first meeting early in July in Washington under the chairmanship of Otto W. Brandhorst, member of the task force and immediate past president of the A.D.A. A second meeting was held July 22 in Chicago.

STANDARDIZATION OF JOURNAL SIZE URGED BY CONFERENCE

A recommendation that state societies attempt to standardize the page size of their journals and a request to the Council on Journalism to investigate the possibilities of joint purchase of paper were made at the third Conference on Dental Journalism held June 18-19 in Chicago. The recommendation that a 6 by 9 inch page size be adopted was made on the grounds that national advertising could be attracted more readily if the advertiser could use the same advertising plate size for all journals. The joint purchase of paper might result in cutting costs for the state journals, conferees stated, as large purchases would make possible ordering directly from the paper mill.

The conference was attended by 44 persons, representing 32 journals, of which 23 were state society journals, 6 were national journals and 3 were component society journals. In addition 6 members of the Council on Journalism and 2 officers of the American Association of Dental Editors attended.

William L. Barnum, chairman of the Council on Journalism, and Walter C. McBride, president of the American Association of Dental Editors, presided at the conference.

PAMPHLET PREPARED ON CARE OF CHILDREN'S TEETH

A revision of the pamphlet *The Care of Children's Teeth*, written in question and answer form, has been prepared by the Division of Dental Health Education. The pamphlet discusses the child's first visit to the dentist, the importance of dental care to deciduous teeth, dental health habits, diet and nutrition. Sample copies may be obtained free of charge from the Division of Dental Health Education at the Central Office.

CANADIAN COUNCIL APPROVES U.S. DENTAL HYGIENE PROGRAMS

The Council on Dental Education of the Canadian Dental Association at a meeting June 21 in Toronto officially approved the dental hygiene programs in the United States which have been approved by the A.D.A. Council on Dental Education. The Canadian Council

already approves all the dental schools in the United States accepted by the A.D.A.

In evaluating Canadian schools, the Canadian council makes use of requirements and standards similar to those used by the A.D.A. Council. Members of the Canadian group have been invited to accompany the A.D.A. visiting committees which evaluate the dental school programs in the United States.

Attending the June meeting were deans of the Canadian dental schools, members of the Canadian Dental Education Council and the Canadian Dental Association. Shailer Peterson, secretary of the A.D.A. Council on Dental Education, also attended.

SUSAN YOUNG JOINS CENTRAL OFFICE STAFF

Miss Susan Young joined the Central Office staff as assistant librarian in the Bureau of Library and Indexing Service in July. Miss Young received her B.A. degree from the University of British Columbia and her B.L.S. degree from the University of Toronto. She will receive her M.A. from the University of Chicago this month. Miss Young has had previous library experience at the public libraries in Toronto and Windsor, Ontario.

She prepared the Association's *Digest of Official Actions* this year under the direction of Donald A. Washburn, director of the Bureau of Library and Indexing Service, whom she will assist in her new position.

DENTISTS COLLECT SUPPLIES FOR KOREA SCHOOL

Hundreds of boxes of dental supplies and equipment have been collected by Association members for shipment to their colleagues in Korea in connection with the Help Korea Train Campaign.

As the dental profession's part in a nationwide campaign to collect 1,000 freight cars of material for Korea, Leslie M. FitzGerald, Association president, asked all constituent and component dental societies to gather dental items of all types for the National Seoul University College of Dentistry, in Korea. Thousands of burs, forceps, dental books, dental units and chairs, impression materials and anesthetics have been collected.

Assisting Dr. FitzGerald as members of a national dental committee in the campaign are: Daniel F. Lynch, A.D.A. president-elect; Leo J. Schoeny, dentist member of the Health Resources Advisory Committee of the Office of Defense Mobilization, and the members of the A.D.A. Council on International Relations, including Oren A. Oliver, chairman, LeRoy M. Ennis, H. M. Flickinger, Obed H. Moen and John A. O'Keefe.

Dental Societies

INDIANA SOCIETY EMPLOYS AN EXECUTIVE SECRETARY

The Indiana State Dental Association established a central office in Indianapolis July 1 and appointed as the Association's first executive secretary Broderick H. Johnson of East Lansing, Mich. Mr. Johnson formerly was director of public relations for the Kellogg Center for Continuing Education.

His experience in public relations, teaching and journalism makes him par-

B. H. Johnson

ticularly well fitted for the new position, stated W. N. Kelly, Association president. Mr. Johnson formerly served on the teaching staff at the University of Wisconsin School of Journalism and also on the faculty of the William Allen White School of Journalism and Communication at the University of Kansas. He held an assistant professorship at Syracuse University and served as acting dean of the Syracuse School of Journalism.

Mr. Johnson has a B.A. degree from Grove City College in Pennsylvania and his M.A. from the University of Wisconsin.

WALTER T. NEWTON DIES, PAST PRESIDENT OF TEXAS SOCIETY

Walter T. Newton, a past president of the Texas Dental Association, died in Paris, France, July 9. He was 58 years old. Dr. Newton was graduated from the Texas Dental College in 1918. He practiced dentistry in Richmond, Texas, after graduation and moved to Houston in 1920 where he practiced until his death.

Dr. Newton was a past president of the Houston District Dental Society. He was a member of the Academy of Restorative Dentistry and a director of the Harris County Historical Society. Surviving are two nephews, E. P. Newton, Jr., William Austin Newton, and a niece, Marguerite Dell Newton.

SOCIETY TO HONOR MYRON AISENBERG

Myron S. Aisenberg, recently appointed dean of the Baltimore College of Dental Surgery at the University of Maryland, will be honored at a testimonial dinner to be given by the New Britain, Conn., Dental Society October 13. Dr. Aisenberg is a native of New Britain and formerly practiced there.

Dental Education

DENTAL SCHOOLS OFFER POSTGRADUATE COURSES

Iowa • A postgraduate course in oral surgery is being offered by the dental school of the State University of Iowa, September 24 and 25. The course will be directed by Merle L. Hale, head of the department of oral surgery and anesthesia. Philip Earle Williams of the American Board of Oral Surgery will be guest lecturer. Advance registration should be sent to William D. Coder, Extension Division, State University of Iowa, Iowa City.

Loyola • Two postgraduate courses in periodontics will be offered at Loyola University School of Dentistry (Chicago) under the direction of Balint Orban and staff. Problems of occlusion in periodontics will be discussed October 21-23 and theory and practice of periodontics January 20-22, 1955.

The school announces also a course in oral surgery October 11-16. Students will perform various types of operations on cadavers, including open and closed reduction of mandibular fractures, partial resection of the mandible with bone grafting and resection of the maxilla for tumors. Attendance is limited to six. Only practicing oral surgeons will be accepted. Further information may be obtained from the school at 1757 W. Harrison St., Chicago 12.

Minnesota • The University of Minnesota announces that the ninth annual seminar for the study and practice of oral medi-

The East Unit of the Dentistry-Medicine - Pharmacy Building (right), University of Illinois, is expected to be ready for the 1954 fall quarter. At Loma Linda, Calif., the College of Medical Evangelists will have a new dentistry building (left). Below right is the Medical Sciences Building, University of California, San Francisco, future home of the College of Dentistry.

cine will be held September 24 and 25 at the Center for Continuation Study on the campus in Minneapolis. The one and a half day program will be devoted to problems of oral diagnosis. Essayists on the program will be: Balint Orban, Lee Roy Main, Harry Sicher, Floyd A. Peyton and Alton K. Fisher.

Temple • A postgraduate course in orthodontics available only to practicing orthodontists will be given by Temple University for two weeks beginning January 23, 1955. Tuition is $200 exclusive of instruments and books.

Application may be made to the director of postgraduate studies, Temple University School of Dentistry, Philadelphia.

Toronto • The University of Toronto announces a series of intensive courses for dentists beginning in September. Included among them are courses in anatomy as applied to dentistry, September 13-15; dental radiology, November 29 to December 3; periodontics, January 17-21, 1955; endodontics, March 7-11, 1955; orthodontics for the general practitioner, March 28-April 1, 1955; periodontics, April 25-29, and dental oral surgery and anesthesia, May 2-6, 1955. Information on enrollment may be obtained from the dean, Faculty of Dentistry, University of Toronto, Toronto 2-B, Ontario.

EXPANSION OF COLLEGE ANNOUNCED BY NEBRASKA

Architects are working on plans to remodel the second and third floors of Andrews Hall at the University of Nebraska College of Dentistry to provide for expansion of the college. The school wishes additional space in order to train a larger number of students, to offer a training program for dental hygienists and to de-

velop research projects in dentistry and its related fields.

Sufficient remodeling will be completed during the summer months to make possible the admittance of a larger freshman class in September 1954. The dental hygienist program will be instituted in September 1955.

Captain Faubion

NEW BUILDING BEGUN FOR OREGON DENTAL SCHOOL

Construction of a new dental school building, which will accommodate 300 dental students and 40 dental hygiene students, was started last month at the Oregon School of Dentistry in Portland. The building is scheduled for completion in June 1956. Harold J. Noyes, dean of the school, said the building and equipment for it would cost about $3,600,000. Taking part in the ground-breaking ceremonies were officials of the Oregon State Dental Association and the Portland District Dental Society.

National Defense

NEW DEPUTY CHIEF NAMED FOR NAVY DENTAL DIVISION

Rear Admiral Daniel W. Ryan, head of the Navy Dental Corps, has announced the assignment of Capt. Bernard Herbert Faubion as deputy chief of the Dental Division. Captain Faubion, who assumed his new duties July 1, relieves Capt. Robert P. Irons. Captain Irons has been named head of the dental department at the U.S. Naval Training Center in Bainbridge, Md.

Captain Faubion was graduated from the University of Southern California School of Dentistry in 1934 and was appointed a lieutenant (jg) in the Navy Dental Corps in 1936. Early in his Navy career he served on duty in the Panama Canal Zone and at the U.S. Naval Academy at Annapolis, Md.

During the Korean war he served as chief of the dental service of the U.S. Naval Hospital in Yokosuka, Japan. Prior to his appointment as deputy chief of the Navy Dental Division, Captain Faubion was head of the professional branch of the Dental Division.

COLONEL BEEBE, DENTAL CORPS, DIES AT 47

Lt. Col. Douglas M. Beebe, dental research consultant for the Bureau of Standards and World War II chief of the Army dental services in the Alaskan-Aleutian command, died July 3 at Walter Reed Hospital of a heart ailment. He was 47.

Colonel Beebe was graduated from Colorado University and Northwestern University Dental School. After overseas service in World War II, Colonel Beebe became chief of dental services at the Miami Beach redistribution center. He later held the same position at Welch Convalescent Hospital in Florida.

In 1949 he became a member of the Research and Development Board of the Surgeon General's office. Four years later he was assigned to Walter Reed Hospital and to the dental material testing section of the Bureau of Standards, where he was actively engaged in research until his death.

Colonel Beebe was a member of the American College of Dentists and the American Association for the Advancement of Science.

DEANS TO BE ASKED FOR INFORMATION ON GRADUATES

The National Advisory Committee to the Selective Service System in an information release July 12 requested state chairmen to ask deans of the dental schools for information on 1954 graduates. The purpose of the survey is to determine the military status of each graduate and to see whether those graduates who are immediately liable for service have applied for commissions.

Meanwhile, the Army has started a procurement campaign for volunteers regardless of priority for the Dental Corps. If the campaign is successful, it may postpone indefinitely a further draft call by the Army on the Selective Service System.

International

DENTAL PROGRAM DISCUSSED AT GENEVA HEALTH MEETING

An expanded dental health program to include a full-time dental health officer was proposed to a committee of the World Health Organization meeting in Geneva May 4-21, but no formal resolution to implement a program was presented to the WHO Assembly. Delegates believed that financial problems facing WHO made further study necessary before comprehensive plans to combat dental disease could be initiated. Some dental health work is now being carried out in connection with the Organization's activities in nutrition, and maternal and child welfare work.

The proposal to develop a long range program in the field of dental health was submitted to the Program and Budget Committee by the delegations of Denmark, Norway, Sweden, Finland and Iceland. Harold Hillenbrand, A.D.A. secretary and official member of the U.S. delegation to WHO, pointed out that requests for more attention to dental health had been made at various sessions of the Health Assembly and stated that surely a modest beginning could be made in long range planning of dental health measures.

An expanded dental health program had been urged originally by the Fédération Dentaire Internationale at a meeting of the WHO executive board in January and February. At that time the Board adopted a report which said in part, "The time has come when special attention should be given to the promotion of dental health programs."

Delegates from 71 nations as well as observers from medical and scientific societies, governmental and nongovernmental organizations interested in health problems attended the World Health Assembly. In technical discussions held simultaneously with the meeting health problems in rural areas were considered. Three awards for outstanding achievement in social medicine were given, one to J. R. Coatney, of the National Institute of Health, Bethesda, Md., for original research on malaria. A one million dollar increase was voted in the WHO budget. The 1955 World Health Assembly will meet in Mexico City.

OREN OLIVER, OTHER OFFICERS RE-ELECTED AT F.D.I. MEETING

More than 1,000 delegates from 24 countries attended the 42nd annual meeting of the Fédération Dentaire Internationale held June 8-13 in Scheveningen, Holland. The Fédération re-elected all its officers for another term, passed a resolution urging authorities interested in health matters to support dental research designed to develop effective preventive measures and discussed the role of the F.D.I. in the dental health activities of the World Health Organization.

Oren A. Oliver, a former president of the A.D.A., was re-elected to a third term as president. Re-elected vice-presidents were Philip Adams and LeRoy M. Ennis of the U.S.A., J. Deliberos of France, Albert Joachim of Belgium and W. Stewart Ross of England. Jack Stork of Holland continues as treasurer and G. H. Leatherman of England as secretary-general. Charles F. L. Nord of Holland was named honorary president. Harold Hillenbrand, A.D.A. secretary, was re-elected an honorary vice-president.

Ten U.S. dentists were named members of commissions. John W. Knutson of Washington, D. C., was named to the public dental health services commission; Francis A. Arnold of Washington, D. C., Maynard K. Hine of Indianapolis, Lester W. Burket of Philadelphia and H. Trendley Dean of Chicago to the scientific commission; Brig. Gen. Marvin E. Kennebeck of the Air Force, Lt. Leyland J. Meder of the Army, and Capt. G. L. Parke of the Navy to the armed forces commission; Shailer Peterson of Chicago and William N. Hodgkin of Virginia to the dental education commission.

In addition, three Americans, J. Roy Blayney, H. Trendley Dean and Otto W. Brandhorst, were named to the juries which will award the Miller, Albert Joachim and Georges Villain prizes. The Fédération also established a new prize, in memory of Alfred Rowlett, a past president of honor.

The F.D.I., it was reported, has been invited to appoint observers to the World Health Organization Regional Committee meetings and also has been asked by WHO to submit a list of persons who might serve as short-term dental consultants should such consultants be required. This was the first time that the advice of the F.D.I. had been sought in dental matters by the WHO. The Fédération again urged that the WHO appoint a permanent dental officer to implement a comprehensive dental program. Harold Hillenbrand, A.D.A. secretary and a U.S. delegate to the 7th World Health Assembly, gave a report on the WHO meeting to the F.D.I. General Assembly.

The F.D.I. elected to full membership the Association des Licencies et Dentistes Universitaires of Belgium, the Malayan Dental Association, the Burma Dental Association, the Stomatological Society of Greece and Suomen Hammaslaakariliitto of Finland.

The 1955 meeting of the F.D.I. will be held in Copenhagen in August. The 1956 meeting is scheduled for Zurich.

In addition to Dr. Hillenbrand, U.S. delegates to the F.D.I. meeting included C. Willard Camalier, John W. Knutson, Arno Bommer and Herbert Loeb.

TRAVEL COUPON PLAN DEVELOPED BY UNESCO

A travel coupon plan designed to ease currency problems for persons wishing to study or do research abroad has been developed by UNESCO. Similar to the UNESCO coupon plan for books (see the June issue of THE JOURNAL), the travel coupon scheme enables a person to buy coupons in his national currency and to cash them in the currency of the country to which he travels. They are a form of international traveler's checks.

UNESCO makes available its own hard currency reserves to facilitate the currency exchange, thus helping to remove a handicap which restricts educa-

tional travel between countries. Information on the travel coupon plan may be obtained from the Council on Student Travel, 53 Broadway, New York.

GREEK DENTISTS SEND PLEA FOR HELP AFTER EARTHQUAKE

A plea for help has been received from the Association of Dentists of Karditja, Thessaly, Greece. The dentists write that earthquakes in Thessaly have destroyed the dental clinics and that dental care has completely stopped, as it has been impossible to offer proper aid to patients in the open air.

The Greek general consulate reports that three quarters of the homes in Thessaly have been destroyed. The consulate recommends that any dental equipment sent to Greece should be nonelectrical, as there is no electricity. President of the Association of Dentists of Karditja is Demetrius Liakos.

GUATEMALA DENTAL SOCIETY INSTALLS OFFICERS

Installed as officers of the Guatemala Dental Society according to a report received July 7 were Eduardo García Salas, president; J. Antonio Pinágel, vice-president; Hector Serrano Roa, secretary; Jorge Braham J., assistant secretary; Gabriel Rámila C., treasurer, and Enrique Estrada, librarian.

M. I. CONNER HEADS HAWAII DENTAL SOCIETY

The Hawaii Territorial Dental Society held its 52nd annual meeting in Honolulu June 24-26. Elected officers were: M. I. Conner, president; A. M. Ito, president-elect; T. M. Otake, treasurer; John H. Dawe, secretary, and R. N. Ogawa, assistant-secretary. June 15-18, 1955, is the time set for the 53rd annual meeting.

ENDODONTICS SOCIETY FORMED IN MEXICO

The formation of the Mexican Society of Endodontia was announced in June. Serving as officers are: Yury Kuttler, president; Raúl Espinosa, secretary; Félix Loperena, treasurer; Ulises Gutiérrez, first representative, and Eduardo Ortega Z., second representative.

PARAGUAY DENTISTS REPORT NEW OFFICER LIST

The general assembly of the Círculo de Odontólogos del Paraguay on April 25 elected the following officers: Artemio Salerno Netto, president; Guido R. Ciotti, vice-president; César B. Franco, secretary; Victor A. Boettner, assistant secretary; Miguel Ángel Barreiro, treasurer, and Juan Pablo Gorostiaga, assistant treasurer.

Public Health

NAPLES FLUORIDATES AGAIN, U. S. TOTAL NEARS 1,000

Nearly 1,000 communities were fluoridating their water July 15 as five new towns were added to the total during the first two weeks in July. At Naples, Fla., where the program had been stopped, fluoridation was reinstituted as a result of a referendum July 6 in which voters cast ballots two to one in favor of the health measure. The Naples program began originally in 1951 and was discontinued in 1953 to await a referendum.

Other communities reporting programs were Martinez, Calif., State College, Pa.; Hinton and Welch, W. Va. Nearly 18 million persons are now served by fluoridation programs, and over 21 million are drinking water containing fluorides.

Further evidence of the support for fluoridation was gathered through a

study conducted by the Health League of Canada. The League, which sent questionnaires to the heads of departments of preventive medicine in 92 North American universities, reports that out of 76 departments responding to the survey, not one opposed the principle of fluoridation and 69 favored the measure.

The Portland, Ore., League of Women Voters also added its name to the list of fluoridation supporters. Endorsement of the caries-preventive measure was voted recently after the League's fluoridation committee completed a comprehensive eight month study.

THREE LEGAL VICTORIES WON IN FIGHT FOR FLUORIDATION

Three legal victories for supporters of fluoridation occurred recently. In June, the U.S. Supreme Court refused to review a California Supreme Court decision upholding the right of San Diego to fluoridate its water. It was the first time that the nation's highest court had announced a ruling involving the fluoridation of community water supplies. In effect, the Supreme Court sustained the profluoridation ruling of the California court.

The second decision involved the city of Tulsa, Okla. Here the Oklahoma State Supreme Court ruled June 15 that the city was within its rights to undertake a fluoridation program, and in a third case, Circuit Court Judge Ronold A. Drechsler ruled for the city of Milwaukee in a decision handed down June 23.

Judge Drechsler said that the June 23 ruling was the first court decision on the legality of fluoridation in Wisconsin. In a thorough and comprehensive opinion, the judge pointed out that "the purpose [of fluoridation] is to promote and protect the public health" and that the right of a city to adopt a public health measure

On hand May 26 to watch the start of the fluoridation program in Richland, Mo., were: B. E. Klein, chairman of the council on dental health of the Central District Dental Society; C. E. Presnell, director of the Bureau of Dental Health, Missouri State Division of Health; Charles Gillooly, U.S. Public Health Service; Ralph Rosen, state chairman of the Council on Dental Health; David W. Brock, past president, Missouri State Dental Association, and James R. Amos, M.D., director, Missouri State Division of Health. Richland is the first Missouri community to begin fluoridation.

does not depend on the existence of an emergency, an epidemic, a contagious or infectious disease. The judge said further that the health measure is not a violation of religious freedom and is not the practice of medicine, dentistry or pharmacy by the city.

The Oklahoma Court stated that "there can be no distinction on principle between [fluoridation] and compulsory vaccination or inoculation, which, for many years has been well-established as a valid exercise of police power." The court said also that it could see no point in making a legal distinction between the right of a city to treat its water with chlorine and its right to fluoridate.

CATHOLIC WEEKLY CRITICIZES FLUORIDATION FOES

America—National Catholic Weekly Review in its July 3 issue criticized the use of such labels as "subversive" and "Communist" in the propaganda of some opponents of fluoridation. The magazine deplored this "antiCommunist hysteria" and said:

> The reckless use of tags such as "subversive" or "Communist" plays directly into the hands of the enemy. The gullible see Reds behind every bush, while the more pollyannaish pooh-pooh the danger through failure to recognize a real threat where there is one.
>
> Last April 6 the citizens of La Crosse, Wis., were debating a referendum on the fluoridation of their drinking-water supply. A handbill of the Citizens Committee Against Fluoridation broadly suggested that the program of fluoridation, allegedly for the prevention of dental caries, was in reality "Communist-inspired" and "a method of Red warfare." It was quite reasonable to believe this, the bill said, "since the U.S. Public Health Service has fathered the fluoridation program in the United States." The anti-Red opposition to fluoridation did not end there. On June 1, Rep. Clare E. Hoffman of Michigan had reprinted in the appendix of the Congressional Record a letter from the Dickinson County Anti-Fluoridation Council of Iron Mountain, Mich., in reply to a request for evidence of Communist influence in the USPHS. "The slow mass poisoning of the entire population of the United States," it said, "is the main objective of communism." Nothing remotely resembling "evidence" of subversion turned up in the 25-item letter. If endorsing fluoridation is evidence of Communist leanings, then we must include among the Red-tinted conspirators the American Medical Association, the American Dental Association, the National Research Council and the American Public Health Association, all of which have approved fluoridation. "Anti-Communist hysteria" is a much overused term, but this looks like the real article.

Research

STUDY SHOWS NO HARM TO BONE GROWTH FROM FLUORIDE

A study of the effect of fluoride in drinking water on the osseous development of the skeleton in children showed that there was no adverse effect on the growth and development of their bones as a result of continuous use of drinking water which contained naturally as much as 6.2 ppm of fluoride. The study was made by H. Berton McCauley and F. J. McClure and was reported in the July 1954 issue of *Public Health Reports*.

Dr. McCauley, director of the bureau of dental care of the Baltimore City Health Department, was engaged in research on problems related to dental health at the National Institute of Dental Research from 1945 to 1949. Dr. McClure has been associated with the National Institutes of Health since 1936 and has done extensive research on the physiological effects of fluorine.

Dr. McCauley and Dr. McClure studied children aged 7 through 14 years from Lubbock and Amarillo, Texas, and Cumberland, Md. These communities use drinking water which contains fluoride in amounts of 3.5 to 4.5 ppm, 3.3 to 6.2 ppm, and 0.1 ppm, respectively. Roentgenograms were taken of the right hands and wrists of 2,050 children. From the roentgenograms the skeletal age was assessed and a quantitative index of

ossification was determined. No evidence was found of any harmful effects from the drinking of fluoride-bearing water.

"These results," the report says, "confirm the safety of maintaining the fluoride level of public water supplies at about 1.00 ppm F, by controlled fluoridation, for the reduction of tooth decay."

ULTRASONIC HANDPIECE DEVELOPED AT COLUMBIA

The development of an ultrasonic handpiece vibrating 29,000 times a second has been announced by Carl R. Oman and Edmund Applebaum of the School of Dental and Oral Surgery at Columbia University. The new instrument is an adaptation to dentistry of a machine tool now widely used by industry for precision cutting of resistant materials.

It is reported that the new device is quicker and quieter than conventional rotating burs and that patients on whose teeth it was used felt no pain. A preliminary report, which was published in the July issue of the *New York State Dental Journal,* called attention to possibilities in the new technic for making cuts of predetermined shapes and sizes with high precision.

Some of the basic research and preliminary animal studies were conducted jointly by the Naval Dental School and the Naval Medical Research Institute in Bethesda, Md. A demonstration of an ultrasonic drill operating at 25,000 vibrations a second was made in May at the annual meeting of the British Dental Association. (See THE JOURNAL, page 254; also July issue.) Experiments on the British device are being carried on by the Royal Air Force.

General

J. ROY BLAYNEY RETIRES AS DIRECTOR OF ZOLLER CLINIC

J. Roy Blayney, director of the Walter G. Zoller Memorial Dental Clinic, retired from his position last month. He had been director of the clinic since 1936.

Dr. Blayney is a former chairman of the Association Council on Dental Education, a past president of the Illinois State Dental Society and former chairman of the committee of dental health of the Chicago Dental Society. He has served in leadership positions in other professional organizations also. In 1952 he was vice-president of the Institute of Medicine of Chicago. The year previous he served as president of the American Academy of Oral Pathology. He is a past president of the International Association for Dental Research and a past secretary of the American Association of Endodontists.

In May 1954 Dr. Blayney was appointed consultant to the Dental Research Advisory Committee of the Office of the Surgeon General of the Army.

Dr. Blayney will continue as director of the fluoridation project in Evanston, Ill.

NATIONAL COUNCIL LAUNCHES HEALTH CAREER DRIVE

The National Health Council on June 16 launched a nationwide drive to increase the pool of health manpower. "Operation Health Career Horizons, by bringing to the young people in our 26,000 high schools information on a wide range of health career opportunities, will

Charles Weinrich and William Cleland, the only two remaining founders of the Delta Sigma Delta dental fraternity, were honored June 8 at a fraternity dinner in Ann Arbor, Mich. Shown (l. to r.) are: Dr. Cleland, John Travis, former professor of operative dentistry at the School of Dentistry, University of Michigan, Dr. Weinrich and Paul Jeserich, dean of the School of Dentistry, University of Michigan.

open new channels to recruitment and enable all the health professions and their supporting services to reach more and more candidates," said A. W. Dent, president of the Health Council.

The drive is an outgrowth of the Council's 1954 National Health Forum held in March. At the Forum, leaders in education met with representatives of 48 national health organization members, including the American Dental Association, to discuss health manpower problems. The Council will publish a guidebook on health careers for teachers and vocational counselors, a leaflet for students and parents and posters to be used in the classroom and by the community.

PLAQUES PRESENTED TO FRATERNITY FOUNDERS

Bronze plaques were presented by Delta Sigma Delta dental fraternity to its only remaining founders, Charles P. Weinrich of Hammond, La., and William Cleland of North Hollywood, Calif., at a dinner held June 8 in Ann Arbor, Mich. Dr. Weinrich will be 94 years old in November, and Dr. Cleland is 90 years old. The two men were celebrating the 70th anniversary of their graduation from dental school and the 72nd anniversary of the founding of Delta Sigma Delta, oldest of the dental fraternities.

Over 200 people attended the dinner. Greetings came from various organizations and outstanding men in the field of dentistry in the United States and abroad.

CORRECTION APRIL JOURNAL

The April issue of THE JOURNAL carried an article entitled "A New Local Anesthetic Agent." An error occurred on page 410, first paragraph. The corrected sentence reads, "Results obtained by using trypan blue intradermal irritation tests in rabbits showed its toxicity to be about one eighth as irritating as tetracaine."

ORAL PATHOLOGY INSTITUTE PLANS REISS LECTURE

The New York Institute of Clinical Oral Pathology announces that the third Herman L. Reiss Memorial Lecture will be held at the New York Academy of Medicine October 25. Raymond J. Nagle, dean of the New York University College of Dentistry, will lecture on the function of the temporomandibular joint.

ELMER S. BEST, DENTAL SURVEY EDITOR, DIES

Elmer S. Best, editor of *Dental Survey*, died July 9 at the age of 73. Dr. Best was graduated from the Chicago College of Dental Surgery in 1906 and attended the Royal College of Dental Surgeons in Toronto, Canada, as well. He is the author of more than 60 articles in dental and other professional publications.

Dr. Best served as secretary of the International College of Dentists from 1937 until his death and had been registrar of its United States section since 1935. He was a past president of the Minneapolis District Dental Society and a past president of the Xi Psi Phi dental fraternity. He was a member of the American Association for the Advancement of Science and of the International Association for Dental Research.

L. N. HARLOW, PROMINENT FLORIDA DENTIST, DIES

Lloyd N. Harlow, first director of dental health for the Florida State Board of Health, died May 30 in St. Petersburg, Fla. He was 58 years old.

Dr. Harlow was active in the affairs of organized dentistry. He served the Florida State Dental Society at various times as president, vice-president and secretary. He had also been business manager and associate editor of the Society's journal and was a representative to the House of Delegates of the American Dental Association for several years. He was a past secretary of the Florida Public Health Association.

Also . . . The New Zealand Dental Association and the New Zealand Health Department have started a fluoridation study project in the town of Hastings. The project is believed to be the first program of controlled fluoridation in the Pacific area. . . . The 82nd annual meeting of the American Public Health Association will be held in Buffalo October 11-15. . . . One day seminars sponsored by local dental societies and planned by the Bureau of Dental Health of the West Virginia Department of Health and the State dental society will be held in five West Virginia cities during October. The theme is "Diet in the Control of Dental Caries." . . . The Southwestern Society of Orthodontists will meet October 10-13 in Oklahoma City and the Northeastern Society of Orthodontists in Boston October 25 and 26. . . . A "Pencils Please" campaign under the sponsorship of the Save the Children Federation is underway to collect millions of pencils for youngsters all over the world who now must learn to write by tracing letters in the dirt. Pencils may be sent to "Pencils Please," 1721 Park Ave., New York. . . . The New England Dental Society meets in Boston October 20 and 21. . . . Operative dentistry will be the theme of the clinic of the Washington Alumni Chapter of Alpha Omega Fraternity scheduled for Washington, D. C., October 13. . . . J. B. Carr, former trustee of the 7th district, died July 20. An obituary will be published in the August JOURNAL.

International Correspondence

NEWS FROM GREAT BRITAIN

Professor H. H. Stones, dean of the School of Dental Surgery, University of Liverpool, gives the following information regarding the selection of candidates for admission to dental schools in Great Britain and Northern Ireland.

Each dental school is now associated with the university in the vicinity, and the university grants degrees in dentistry. The degree open to the undergraduate student is the Bachelor of Dental Surgery (B.D.S. or B.Ch. D.). The Royal College of Surgeons in England, the corresponding Royal College in Edinburgh and Glasgow and most of the English universities also grant a license in dental surgery (L.D.S.), the course for which is usually shorter than that for the degree. Before a candidate can be admitted to a dental school he must have passed a public preliminary examination in general education and for the degree must have satisfied the minimum university entrance requirements to a degree course. These requirements vary somewhat, but the following is a typical example.

The public examination that a boy or girl takes when at school in England is now termed the General Certificate of Education. In this examination the various subjects can be taken at either ordinary level or advanced level. It usually takes two years from the time a student passes a subject at ordinary level at 15 to 16 years of age before sufficient knowledge is acquired to pass at the advanced level. To satisfy the entrance requirements to the degree course the candidate must pass in five or six subjects which include English language, an approved language other than English, either mathematics or an approved science subject, and three other approved subjects (two of the subjects must be taken at advanced level).

In some universities candidates are required also to have passed in chemistry and physics at no less than ordinary level. This must not be confused with the later study of chemistry, physics and biology that is usually taken at the university in the first year dentistry course. If, however, these subjects have been passed at the advanced level, in most universities the student can obtain exemption from the corresponding subjects in the predental course. For the L.D.S., the universities usually require the same entrance requirements as for the degree.

The Royal College of Surgeons of England has just introduced the following requirements: Candidates may commence the dental curriculum proper on producing evidence that they have obtained the General Certificate of Education with "passes" in English language, a language other than English, either mathematics or an approved science subject, and have passed chemistry, physics and biology in the General Certificate of Education at the advanced level or in the premedical examination of the Royal College of Surgeons.

A confidential report is obtained from the headmaster or headmistress which gives an assessment of the candidate in terms of his health, personality and academic promise. It is now customary for a small committee from the dental school to conduct a personal interview with the candidate. Few British dental schools have given aptitude tests. In the one or two that have done so, the tests include exercises such as bending wire into a circle or square, carving wax into the shape of a four sided pyramid and molding plasticine.

The selection committee grades the candidates. Preference is given, of course, to those receiving the highest grades; but as a result of the reduction in the number of applications, every suitable candidate usually can now be given a place. Applicants residing outside the United Kingdom have to produce adequate evidence of their integrity, suitability and knowledge of the English language.

SHORTAGE OF STUDENTS

There has been a serious falling off in the number of students in the majority of dental hospitals in Great Britain, and the British Dental Association is taking steps to see how this serious condition can be remedied. Many of the schools have vacancies. It is feared that there will be a diminution in the number of practitioners on the Dental Register if this situation is allowed to continue. *The British Dental Journal* of June 15th published in its News Sheet 27 some details of the 1954 Dental Register. In 1925, when the number of dentists registered under the 1921 Act was virtually at its highest, there were 13,818 names on the Register. Thirty years later the total had gone up to 15,549, and the composition of the Register had almost completely changed as the following table shows.

Class	No. registered Year 1925	1954
Graduates and licentiates	5,447	11,790
Registered under Dentists Act 1878	984	2
Registered under Dentists Act 1921	7,296	3,283
Colonial	59	216
Foreign	32	258
Total	13,818	15,549

It will be seen that the dentists licensed under the Act of 1878 have virtually vanished from the register, secondly, that the graduates have increased by approximately 6,000, having more than doubled in number during the period, and thirdly, that the number of dentists registered under the Act of 1921 has decreased by more than half during the same period. The result of these changes has been an increase in the Register of only 1,700.

During the same period, however, the population of the British Isles has increased from approximately 44,000,000 to 50,000,000. The result is that today there are 15,500 dentists to treat a population of 50,000,000, approximately one dentist to 3,250 persons. In 1925 there were 13,800 dentists to treat a population of 44,178,000, or 1 dentist for each 3,200 persons. The Teviot Committee recommended about 20,000 as the optimum number for the Register. It would follow that there is today a shortage of about 4,500. Clearly a gain of under 60 per annum is not going to solve the problem. Unfortunately there is at present no sign of any increase in the rate of recruitment.

THE ULTRASONIC DRILL

H. A. Pitt Roche of London, who demonstrated the ultrasonic drill at the annual meeting of the British Dental Association in Blackpool, has contributed the following notes.

The 50 watt ultrasonic drill consists of an ultrasonic generator and a magneto-restrictive transducer on a bench type drill stand. The two are connected by a four core cable, and controls are limited to an on-off switch and a tuning control; the power is obtained from A.C. mains. Primarily intended for the machining of hard and brittle materials such as glass, ceramics, tungsten carbide, diamond and synthetic jewels, the drill has a reciprocating action instead of the conventional rotary one. Thus the cutting of materials is not confined to circular holes, but the cut follows the shape of the drill selected. Most complex shapes can be cut and machined with a finish of 20 microinches.

The machine has a nominal frequency of 20,000 vibrations per second and a nominal amplitude of 0.0003 inches. The tools can be made of brass or mild steel and are used in conjunction with an abrasive slurry. The abrasive can be silicon carbide, boron carbide, diamond bort or ruby, and is mixed with water. Little wearing of the tool takes place as the tool merely acts as a conveyer for the abrasive. The speed of the cut varies with the material being worked and the size of the tool; but a ¼ inch solid tool will penetrate soda glass to a depth of 2 mm. in 60 seconds, and higher cutting speeds are obtained by using hollow or trephining tools. It is found that with little adaptation the tool can be used on tooth surfaces in the mouth.

With trephining tools shaped to the conventional type of cavity preparation, it is found that cutting can be effected fairly quickly and with extreme accuracy. Little skill is called for on the part of the operator, as the shape of the cavity is predetermined by the shape of the tool. Provided the frictional heat is dispersed by the watery abrasive, little or no pain occurs, and the sensation is not unpleasant. The effect on the pulp tissues has not yet been investigated fully, but teeth drilled ultrasonically to date have not shown any adverse symptoms. Experiments are continuing, as it is felt that the ultrasonic drill may well prove a useful adjunct to dental equipment.

ITEMS OF INTEREST

The Ministry of Health, with the full support of the British Dental Association, is taking steps to implement the findings of the United Kingdom Mission which visited the United States to study fluoridation, and it is hoped that an investigation in a selected town will commence in the near future. As in the United States, there has been considerable opposition from some quarters, and the British Dental Association by a series of panel discussions and lectures is striving to bring home to the practitioners the advantages of fluoridation in the fight against dental caries.

Dr. Roper Hall, who has been the Association's honorary treasurer for many years, unfortunately, because of ill health, has had to resign this position which he has held with such distinction, and Dr. Gilbert, a member of the Council, has been elected to take his place.

Gerald H. Leatherman,
D.M.D., F.D.S.R.C.S.

The status of the dental profession in France

At the present time graduates of French dental schools receive only a certificate which does not confer the title of doctor. The French dental profession feels that the absence of such a title places a mark of inferiority on the profession and is attempting to rectify the situation. A report, excerpts of which follow, was prepared by J. Foure. Dr. Foure received his D.D.S. from Ohio State University and also holds a degree from the Faculty of Medicine of Paris.

The Minister of Education in France is presently considering whether French dental students shall, upon completion of their studies, receive the title of Doctor of Dental Surgery, or whether they shall continue to obtain as before a mere certificate giving them the right to practice dentistry.

Various attempts have been made in the past to obtain for French dentists the recognition which is symbolized by a doctor's degree. Today, the exceptional vitality of professional life in France and especially the earnest desire to reorganize dental studies have led to another attempt for recognition. French dentists believe that the course of study in French dental schools is of sufficiently high caliber to justify the awarding of a doctor's degree. The absence of this title gives to dentistry an inferior status.

The title of "Dental Expert" was made available to French dentists in 1699 by an edict of King Louis XIV, but with the French revolution, all regulations with regard to acts of healing, including those of dental care, were abolished, and when, in 1803, regulations for the healing arts were reinstituted, no provision was made for dentists. Consequently, to a considerable extent, the care of the teeth fell into the hands of charlatans.

In 1892, a group of French dentists decided to unite their efforts to raise the standards of their profession by giving it a legal status and by providing a formal education for prospective dentists. Thanks to members of the profession, dentistry has made rapid progress. However, it has lost its prestige and impetus to advance since it has not acquired standing as a qualified and independent profession.

THE DENTAL SCHOOLS

French dental schools were founded as nonprofit organizations by groups of leading practitioners at the end of the last century. The right of these schools to grant a certificate has been officially recognized. The curriculum has been improved constantly. Entrance requirements have been raised. The course of study is five years. Today the level of studies is among the highest in European dental schools. In spite of this, the certificate is only validated with the assent of the Faculty of Medicine.

Another factor which explains the inferior status of French dentistry is the existence of a competing group of practitioners known as "stomatologists."

Stomatologists are first graduated from the medical faculty and receive, therefore, the title of doctor. After graduation, they follow a two year course in a school of stomatology, where they specialize in oral surgery and become acquainted with the various other aspects of dentistry.

A dentist is limited in his field of work; the doctor of medicine is not. He has the legal right to practice dentistry even without having received the two years of formal training in the subject in a school of stomatology.

There is no doubt that the two years of special training provided the student of stomatology qualifies him in oral medicine, oral surgery and even maxillofacial surgery. However, his training in general dentistry does not in any way equal that of the graduate of a dental school.

AUTONOMY IN DENTISTRY

In spite of the numerical inferiority of the stomatologists (there are about 730 as compared to the 13,000 dentists), they have always been an influential group in France. This influence results from the prestige of their title of "doctor," of which they are naturally jealous. The stomatologists contend that if dentists are to receive the title of doctor, they must earn it by traveling the same path as the stomatologists.

The dental profession, on the other hand, is opposed to this proposal as, if adopted, it would make the dental profession totally subservient to the medical profession. It has

learned by experience that only by total autonomy is dentistry able to progress.

Secondly, the need for practitioners could not be met if, instead of five years of dental training, the full medical course plus three years of stomatology were required. Only a few students would be willing or financially able to meet the lengthened educational requirement.

The dental schools themselves have taken the initiative in the struggle to improve the position of dentistry. Pelletier-Dutemple, director of the Ecole Odontologique de Paris, is among those who have provided able and dynamic leadership. The schools have been unanimously supported by the dental profession and have also acquired the support of many leaders of the medical profession.

A DENTAL FACULTY

The object of the present campaign is to have a dental faculty created, which would be qualified to bestow the doctorate of dental surgery on successful candidates. This would mean that the schools would no longer be privately run, nor would they have to depend for their existence solely on tuition and the willingness of the teachers to contribute their time gratuitously. Instead, the schools would become part of the University, in the same way as are the schools of medicine, pharmacy, law and science. The dental schools, too, would be subsidized by the government. The lack of subsidies has been a most serious handicap in the development of dental schools.

At the present time, the Minister of Public Health and the Minister of National Education are studying a report by Pelletier-Dutemple on all aspects of the problem. French dentistry hopes to see the profession recognized as of equal status with other branches of the healing arts in France and also to acquire an equal status with the dental professions of other countries.

151, Boulevard Haussmann, Paris

The Reader Comments

THE JOURNAL *devotes this section to comment by readers on topics of current interest to dentistry. The editor reserves the right to edit all communications to fit available space and requires that all letters be signed. At the request of the author, signatures will be deleted before publication. Printed communications do not necessarily reflect the opinion or official policy of the Association. Your participation in this section is invited.*

The Editor

STUDIES OF DILUTE IODINE SOLUTION STILL IN PROGRESS

The paper entitled "Lack of Effectiveness of a Dilute Iodine Solution in the Treatment of Gingivitis, Pericoronitis and Recurrent Aphthous Stomatitis" published in the July issue of THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION dealt with the use of an elemental iodine solution prepared from tablets supplied for experimental purposes by Heliogen Products, Inc. Each tablet was stated by the manufacturer to contain: potassium iodide 32.7 mg., chloramine T 29.3 mg., nonreactive organic binder and flavor 165 mg., and effervescent material 421 mg. One tablet added to 120 cc. (4 fluid ounces) of water may be expected to produce a solution of approximately pH 6. The results described in this paper (dealing with short term, 4-6 days, therapy only) pertained exclusively to this elemental iodine solution which is in essence what should be understood wherever the product's trademark name "Heliogen" is used.

Since the inception of the published study (commencing in November 1952 and submitted for publication in May 1953), Heliogen Products, Inc., has cooperated actively with us and, according to information received from the company, has intensively sponsored studies and investigated the differences between iodine solutions of various types and concentrations as to both effectiveness and toxicity. Subsequently, the company has brought to my attention several pertinent studies. In this connection, Heliogen Products, Inc., has informed me that it has modified and may in the future further modify its products in keeping with accepted advances in this field. As the result of my preliminary findings, and since the submission for publication of the published manuscript, I have undertaken additional clinical (long term therapy) and laboratory studies with solutions of elemental iodine from material supplied by Heliogen Products, Inc. The results of these studies will be reported on at a later date.

Austin H. Kutscher

PROTESTS ANESTHESIA ARTICLE

As one who uses general anesthesia in his practice I wish to protest a recent article in THE JOURNAL entitled "Trichloroethylene in Dentistry: General Anesthesia."

I refer particularly to the following statements: "Thiopental sodium has been used extensively in dental office practice. Such anesthesia is fraught with great hazards, and the practice cannot be accepted on a basis of good or safe anesthetic principles."

It is amazing to me that anyone experienced in general anesthetics can make a flat statement of this type and then give no further proof to back the statement. It must be apparent to everyone that general anesthesia in any form is fraught with hazards and no agent is free from risk.

Like many writers critical of the office use of general anesthesia the writers would give the impression that trichloroethylene is perfectly safe and easy to use. May I quote from the most definitive work on this agent today, *Trichloroethylene Anesthesia* by Osterle. "The fairest decision seems to be that trichloroethylene can cause primary cardiac failure in the same way as chloroform, but extremely rarely."

My point is this. The writers of your article give the impression that thiopental sodium is very dangerous and trichloroethylene is very safe. What the authors mean is that they like and trust one agent and that they do not like and trust another agent. In my opinion they have given a very biased and misleading presentation of a very controversial subject.

Leonard L. McEvoy

EXTENDED SOCIAL SECURITY

I, and the great majority of my colleagues, believe that the expansion of Social Security is creeping socialism and demands the most vehement condemnation by all Americans who, if Social Security is expanded, would be shackled to this forerunner of communism.

Social Security legislation is receiving support from the stealthy left wing of both parties and from certain writers in our dental magazines, who attempt to sway the thinking of the gullible with fallacious and deceptive promises of socialistic security.

Socialism has been experimented with throughout the world many times and has had disastrous consequences, for its insidious purpose is to hide the fiscal dilemma resulting from governmental incompetency.

Barron's *National Business and Financial Weekly* states that 25 per cent of our national debt becomes due in 1954; hence the urgency to expand the tax program. Since President Eisenhower signed the bill terminating excise taxes, the need is even more urgent. Passing the Social Security tax bill is political expediency but seems the acme of fiscal stupidity. Once the additional link in the chain of socialism becomes effective, who can predict what increased tax will be levied in the future?

The effort to stem this far-reaching debauchery of American freedom may be in vain. However, I trust organized dentistry will let its voice be heard so that history may record our effort and our respect for the tradition on which this nation was founded.

Garth A. Sherman

INSUFFICIENT EVIDENCE FOR CONCLUSIONS

A paper by Alexander Seelig and others appeared in the May 1954 issue of THE JOURNAL, page 532. This paper recommends the use of a penicillin G potassium and calcium carbonate paste in the treatment of exposed dental pulps. The recommendation is based upon results of an experiment done on only one monkey.

The pulps of 18 teeth were exposed. The paste was placed in 11 teeth. In 8 of these teeth the fillings were either lost or loose so that there were 3 teeth left which could be used for the study. There was 1 control tooth which had the same cement that also covered the 3 teeth on which the paste was used, and there were 4 teeth in which a zinc oxide and eugenol paste was placed over the exposure.

The cement and the zinc oxide eugenol were very injurious to the pulp. This fact is known and has been described before. The penicillin G potassium and calcium carbonate paste, when placed in a large part of the pulp chamber, prevented the ill effects of the cement. There are pictures showing that dentin splints which were actually pushed into the pulp have osteoid tissue around them and form a partial bridge over the pulp. This occurrence, too, has been described in the literature.

The title and contents of Seelig's paper are misleading because they give the impression that the new paste mixture was responsible for the healing of the pulp, whereas in actuality, the paste only prevented the ill effects of the cement.

I believe it is below the dignity of THE JOURNAL to print papers that come to important conclusions in regard to treatment based upon 1 animal, 3 teeth, 1 control tooth and no control as regards the two components of the paste.

Did penicillin have anything to do with the results, or was penicillin mainly a mechanical barrier preventing the irritation which results when cement is placed directly in contact with the pulp tissue . . . a thing no one in his right mind would do anyhow.

In my opinion, the appearance of papers like this in the J.A.D.A. do harm. Dentists may be led into using such a paste. The medical and allied professions will believe that the standards of dental investigations are still far below those of any other field of science.

Helmut A. Zander

Editor's note:
This paper was recommended for publication because it demonstrates that penicillin G potassium and calcium carbonate can be used advantageously in exposed pulps of teeth not previously involved with carious lesions. The editorial consultants agree that from a technical point of view it does not represent a well controlled piece of research as the reader cannot determine from the report how much of the beneficial effect came from the penicillin G potassium, and how much was the result of calcium carbonate. Nevertheless, the study does indicate, even though it does not prove, that the local application of penicillin might be beneficial. Obviously, much more study must be given to the subject before final conclusions can be drawn.

STABILITY OF DENTURES

"The Relation of Occlusal Surfaces to the Stability of Dentures," by Robert S. Ledley, appeared in the May issue of THE JOURNAL.

This well written article analyzed the forces and the engineering equations of action and reaction. This work adds weight to the already impressive evidence on the influence of occlusion in denture retention. A study of Dr. Ledley's article, with its excellent illustrations, will afford the student a working knowledge of lateral forces which could aid him in the placing of posterior teeth. But lateral forces are only a part of the disturbing action, and the writer feels that this fact should be mentioned.

Dr. Ledley is guilty of studying a three dimensional motion in two dimensions. This same error occurs in the work of Kurth and Boswell, whose work is referred to in the article.

Mastication takes place in three dimensions, and by far the most powerful thrust of the mandible is the forward component. This thrust results from the horizontal opening hinge action. When the mandible moves from its open position in a "lanternlike swing" to centric closure, the forward thrust causes a vector of motion that tends constantly to push both upper and lower dentures out of the mouth. The action is analogous to the hinge type nutcracker. The nut would fly out of the jaws if it were not held in place.

Both student and graduate could improve their understanding of this disturbing force in denture instability by reading Harvey Stallard's classic article "The Anterior Component of the Force of Mastication," *Dental Cosmos*, May 1923, pg. 457. They would also profit from my article "Rationale of Denture Retention," *Dental Digest*, June 1946, pg. 315.

William Roy Eberle

Book Reviews

A TEXTBOOK FOR DENTAL ASSISTANTS

By Irwin Robert Levy, D.D.S. Third edition. 272 pages with 232 illustrations and a dictionary containing 1,500 commonly used dental terms. Index. Price $4. Philadelphia, Lea & Febiger, 1953.

The ten chapters in this book, simply written and well illustrated, are designed for the dental assistant who wishes to prepare herself for the certifying examination of her association without taking prescribed courses. The book also can be utilized by the trained dental assistant as a reference work.

The author has completely revised the content of the earlier edition and has added information on new and improved technics. For example, information is included on air abrasive technics and on recent public health theories. The first and second chapters give a good resumé of the duties of auxiliary dental personnel and include basic information on dental office management.

Another chapter provides a minimum survey of dental anatomy which can aid the untrained dental assistant to become more proficient in assisting her employer to record oral examinations.

The methods of proper sterilization are presented, and several types of office sterilizers are illustrated.

Other chapters include such subjects as roentgenology, oral surgery, periodontics, pedodontics and orthodontics and give an excellent foundation for improving the dental assistant's work in these specialties.

Evelyn Maas

COMPLETE DENTURES

By Merrill G. Swenson, D.D.S. Third edition. 735 pages with 882 illustrations, 10 in color. Index. Price $13.50. St. Louis, C. V. Mosby Co., 1953.

The successful construction of complete dentures is directly dependent on the operator's knowledge of the fundamental science. The author logically emphasizes this precept with an excellent description of basic principles and with a practical technic founded on his interpretation of these principles.

In the preface to the first edition, the author stated that "The writing of a book on complete dentures is difficult because the subject is not a static science." It is to be regretted that the third edition, slightly modified 13 years later, does not bear out this original concept. A comparison between editions three and one shows that Dr. Swenson has made few changes, and has added little new material.

The second edition claimed "the elimination of vulcanite," yet the detailed construction of vulcanite base trays is still presented in edition three, along with the construction of shellac bases. We read identical paragraphs on pages 375 and 626 on the need for vulcanite base trays, with no mention of the acrylic autopolymers, which are ideal for this purpose.

Some of the more modern concepts of mandibular movements are not mentioned, although the author stresses that "occlusion is the most important subject in all departments of dentistry."

The author's claim that the bibliography is a "general review of the literature for the last twenty-five years" cannot be substantiated, as this list is identical item for item with the one published in the first edition, and consequently is thirteen years behind time.

If the reader has not become acquainted with Dr. Swenson's first or second edition this book is a "must" for another viewpoint of the "how and why" of denture construction.

L. E. Kurth

CLINICAL DENTAL PROSTHETICS

By H. R. B. Fenn, F.D.S.R.C.S. (Eng.), D.D.S. (Penn.); K. P. Liddelow, F.D.S.R.C.S. (Eng.), H.D.D.R.C.S. (Edin.); A. P. Gimson, L.D.S.R.C.S. (Eng.). First edition. 502 pages with 350 illustrations. Index. Price $10. New York, Staples Press, Inc., 1953.

For some time there has been need for a publication in clinical prosthesis that would approach its technics and problems at a level easily understood by the undergraduate student. This book employs that approach.

One cannot overemphasize, however, the importance of clinical illustrations and schematic drawings to supplement the reading matter. Most of the schematic drawings are ably presented but clinical illustrations are lacking in quantity. In addition, the quality of a few is of doubtful educational value.

Because of the many variables presented in prosthetic cases and the technical skills of

operators, it is difficult to evaluate technics, particularly those employed in impressions and jaw relation records. The section devoted to the use of the face-bow could easily lead to a misconception on the part of the student, even though the technic as illustrated and discussed is quite satisfactory. The arbitrary placement of a mark in relation to certain anatomic landmarks may occasionally result in a completely erroneous recording of the true hinge axis. In those cases, subsequent opening or closing of the articulator for the purpose of correcting vertical height may not be in accord with the relationship as observed in the mouth.

In the discussion of impression technics for partial dentures, sectional compound impressions are illustrated. It would seem that in those cases where the author felt their use was indicated, a hydrocolloid impression would produce more accurate results in a much simpler way.

Bert L. Hooper

MEDICAL SCHOOLS IN THE UNITED STATES AT MID-CENTURY

By John E. Deitrick, M.D., and Robert C. Berson, M.D. 380 pages. Appendix. Index. Price $4.50. New York, McGraw-Hill Book Co., Inc., 1953.

This comprehensive volume is the first that has been prepared on the subject of medical education since the report by Abraham Flexner in 1910. It discusses a study that was made of the medical schools in 1950 "to analyze and define the status of the medical schools as social and educational instruments of modern society."

Part I is an introduction giving some historical information and Part II discusses the function and purpose of a medical school with particular reference to research and service. An analysis of the finances of a medical school is found in Part III. Part IV covers the organization and administration of the medical school and the school's relation to the hospital education programs. Part V deals with curriculum, and Part VI reports on the internship, residency, graduate and the postgraduate programs. The last and remaining portion summarizes the over-all findings and presents a digest of the conclusion and recommendations.

Attention is drawn to the new responsibilities of the medical schools and emphasizes their importance not only to the student, but also to society through the graduate.

One cannot read the report without being impressed, not only with the tremendous growth that has taken place in the educational field in the health sciences, but also with the care with which this study has been made. It is not only a reference book but also furnishes any medical faculty member with the needed background to attack an evaluation of his own effectiveness and his own contribution to medical education. Dental educators will recognize that many of the problems found in dental schools are not unique.

Shailer Peterson

FILMS IN PSYCHIATRY, PSYCHOLOGY AND MENTAL HEALTH

By Adolf Nichtenhauser, M.D.; Marie L. Coleman, and David S. Ruhe, M.D. 269 pages with 13 illustrations. Index. Price $6. New York, Health Education Council, 1953.

It is not too uncommon for a reviewer to read a book that proves interesting. It is indeed a rare privilege, however, to find a book that states a purpose in the beginning, fulfills it and, in addition, provides interest even though its content is specialized.

In a foreword by the publishers, the following statement is made: "The aims of this unique book are, first, to make films in psychiatry, psychology and mental health education more useful to people; and second, to begin to set higher standards of quality for making better new films in this important area of medical science."

To understate the case, this has been achieved.

Briefly, this book has as its main section 51 analytical reviews of films in the three fields which form the title. In addition, there are 50 "thumb-nail" sketches of other significant and available films on the subjects at hand which had been released up to January 1953.

Complete and precise information relating to sources of the films, production data and appraisal accompanies the discussion of each of the major films listed. Four information-packed chapters precede the reviews in which the meaning of these reviews is analyzed, beginning with a chapter, logically enough, on how to use the book.

As if this were not enough to make the book worth while, there is also a chart which is called "Suggested Audience Guide to Films." It simply indicates which type of film would be best for a specific audience.

Although the value of this book may be limited to relatively small groups of people, there is no doubt that here, at least, is one book that is worth considerably more than the

paper on which it is printed. Authors Nichtenhauser, Coleman and Ruhe have every reason to feel proud of their achievement.

Anyone seeking information on a film in psychiatry, psychology or mental health need look no further. Here is "the book."

Theodore C. Levitas

OVEREATING, OVERWEIGHT AND OBESITY

By David P. Barr, John R. Brobeck, Henry W. Brosin, Louis I. Dublin, Frank A. Evans, P. C. Fry, Samuel Gurin, Paul György, Edward E. Hunt, Jr., Ancel Keys, P. S. Peckos and A. W. Pennington. 151 pages. Price $1.50. New York, National Vitamin Foundation, Inc., 1953.

Since obesity has become a national obsession, much information handed out through technical journals, newspapers, magazines, radio and television programs can be ineffective and dangerous. Scientific findings such as are presented in these papers of the Symposium on Nutrition held in Boston, October, 1952, should become common knowledge to students of nutrition and to professional persons handling patients in a dental office.

Included among the papers discussed in this symposium are "Physiology of Appetite," "The Psychology of Overeating," "Fat People Who Lose Weight Live Longer" and "Nutrition in Liver Disease."

Each author has listed a very complete and helpful bibliography on his subject. The discussions following each essay help to evaluate and to probe further the current research work being done in the field.

Anna L. Hehn

SIEG ÜBER DIE ZAHNKARIES DURCH FLUOR

By Walter Drum, Dr. Med. dent. 63 pages. Index. 2.25 German Marks. Berlin, Verlag Die Quintessenz, 1953.

This work presents a brief but comprehensive review of our current knowledge of the role of fluoride therapy in the reduction of dental caries. The author prepared it primarily to bring an up-to-date account of the subject to the German dental profession and the public.

Of special interest is the reference to the recent work of Eichler and Appel. These investigators reported the preparation of a fluorine-containing dentifrice which formed a fluorapatite layer on the enamel surface. They demonstrated this result in dogs, the teeth of which were regularly brushed with their special tooth paste preparation for six weeks. These investigators also demonstrated that a tooth paste which contained both fluoride and calcium ions was ineffective in caries reduction because the calcium within the tooth paste caused the fluoride ions to become bound and unavailable for action on the enamel.

The author is aware of the fact that the Council on Dental Therapeutics of the American Dental Association has not accepted tooth pastes containing fluorides. However, he points out the advantages that would accrue from a tooth paste that would give off fluorine ions, in view of the widespread use of brush and tooth paste in a large proportion of the population.

Isaac Schour

THE DENTIST'S HANDBOOK

By W. R. Tattersall, F.D.S., L.D.S.U. St. And., and H. D. Barry. 328 pages with 2 illustrations. Index. Price 28 shillings. London, Eyre & Spottiswoode, 1953.

This is an extremely interesting and comprehensive manual on the legal, ethical and financial aspects of dental practice in England, Scotland and Wales.

In the first division the authors set forth various statute laws which affect the practice of dentistry and trace their histories from their origin to the present. Two chapters are devoted to the history and development of practice under the former National Health Insurance Acts and the present National Health Service Act.

One section gives an excellent summary of the law of negligence as applicable to dental practice in Great Britain, a section which is of equal application to practice in the United States since it deals with common law principles accepted here as well as in England. The essay on legal principles is continued with a discussion of the contract relationship between patient and dentist with respect to fees for services, the relationship between patient and dentist under the National Health Service Contract and the necessity for consent before commencing an operation upon a patient.

In the second main division, 19 pages are devoted to an outline and description of the jurisdiction of the various courts of the British Isles. The authors then present a 30 page essay on "Identification by Teeth and Jaws" citing many instances in which this necessity has arisen and how the problem was solved. The illustrations of cases are like excerpts from the annals of crime.

The final part of the book is devoted to income tax and retirement income under the National Health Service Act.

While much of the book is not specifically applicable to dental practice in the United States there is a sufficient amount of general information plus sound common sense equally useful in both countries to warrant the addition of this manual to dental libraries, and to warrant its use as a reference work by secretaries of constituent societies if only for the comparative viewpoint it offers to common problems.

F. J. Garvey

COMPLETE DENTURE PROSTHESIS

By Rudolph O. Schlosser, D.D.S., and Daniel H. Gehl, D.D.S. Third edition. 511 pages with 292 illustrations. Index. Price $8.50. Philadelphia, W. B. Saunders Co., 1953.

This book combines the background of Dr. Schlosser's long practical experience, study and teaching with Dr. Gehl's vigorous young approach to the problems of complete denture prosthesis. The book is well written in a clear and understandable style. The illustrations are clear-cut and show what they are intended to show. In general it follows the pattern of previous editions, but it has been modernized and expanded in several sections. The outlines of procedures for making dentures include a classification of operations that must be performed by dentists and those which may be delegated to dental laboratory technicians.

More variations in technics are described than in previous editions to make possible a broader use of the book. The chapter dealing with diagnosis and prognosis is excellent and should be valuable in the practice of prosthetic service. The chapter on tooth selection leaves much to be desired. The form selection method is too mechanical, and insufficient guidance is furnished for color selection.

The chapter on final impressions is improved by a description of some technics other than the technic favored by the authors. Some of the newer concepts of vertical dimension are included. Proper emphasis is placed on centric relation as an essential to successful dentures. Undue emphasis is placed on the lateral condylar adjustment on the Hanau Model H articulator according to the formula. The use of lateral checkbites for the adjustment of the lateral condylar guidances should have been omitted since this instrument will not adjust to lateral checkbites in most instances. The use of abrasive paste for milling-in dentures is certainly open to question.

The variations of procedure and the discussions of new methods and materials make this a better book than the second edition. This book would have been even more valuable if the authors had summarized each chapter with their conclusions regarding the relative merits of the methods they have described.

Carl O. Boucher

PRACTICAL PEDODONTIA OR JUVENILE OPERATIVE DENTISTRY AND PUBLIC HEALTH DENTISTRY

By Floyde Eddy Hogeboom, D.D.S. Sixth edition. 636 pages with 588 figures. Index and appendix. Price $12.50. St. Louis, C. V. Mosby Co., 1953.

In the preface of this latest edition, the author states, "As I look back on the years since the first edition of this book appeared, I am cheered by the marvelous advances in the science and art of dentistry. What was then a small trickle in the care of children by the dental profession has now reached the flood stage. Every dentist now realizes that with our modern knowledge of preventive dentistry and the possibilities in public health all must do their share for the children. This revision is submitted with the same humble hope that it will help to supply information and to stimulate greater activity in the care of the dental needs of children."

The principal values of this book are that it gives to the dental profession the latest scientific applications of dentistry for children and that it promotes a greater interest in our national need for more and better dentistry for children. The book is written in a clear and concise style and continues to be an outstanding contribution to the field of children's dentistry.

The chapter dealing with children's viewpoints is basic to an understanding of the mental and emotional life of a child and his resultant behavior pattern. Pedodontists and other dentists with child patients have a professional responsibility to understand the facts and problems of child development and the role they can play in helping children to achieve both mental and dental health.

Chapters dealing with technics in the treatment of deciduous and permanent teeth are exceptionally well done. In the light of the latest nutritional research and the effect of nutrition on the human dentition and supporting structures, the contents of the chapter dealing with nutrition should be of particular interest to all practicing dentists.

This reader recommends the book as an effective presentation of pedodontics and an exceptional orientation in the area of public health dentistry.

John C. Bergmann

Current Literature

THE CHEMISTRY OF FLUORIDE SOLUTIONS AND EXPERIMENTAL TOOTH DECAY

Nutrition Reviews 12:51 Feb. 1954.

In an investigation which demonstrated that stannous fluoride was superior to sodium fluoride in the prevention of dental caries in the white rat when the compounds were given after tooth eruption, difficulty was experienced in obtaining commercial sodium fluoride of a sufficient degree of purity.

A laboratory method of preparing a pure form of stannous fluoride was worked out. It was found also that solutions of stannous fluoride of a pH of 1 to 2, layered with mineral oil, were less prone to undergo hydrolysis and oxidation.

With the advent of the purified form of stannous fluoride, another experiment was conducted in which the following solutions were compared: (1) fresh, purified stannous fluoride solution, (2) aged, purified stannous fluoride solution, (3) aged, commercial stannous fluoride solution, (4) sodium fluoride solution, (5) aged stannous chloride and sodium fluoride solution and (6) distilled water. The water was used as a control.

The effects both on the prevention of experimental caries in postdevelopmental teeth and on fluoride storage in the bones were determined. The rats were maintained on the experimental solution for 140 days under identical conditions except for the drinking solutions. The teeth were evaluated for dental caries incidence, and the right hind legs were analyzed for fluoride content.

All the rats receiving the three different stannous fluoride preparations had approximately the same fluoride concentration in the bones. This concentration was approximately two thirds of the amount deposited in the bones of the rats receiving sodium fluoride.

All the fluoride solutions used were effective in reducing the number of carious lesions. The effectiveness of the solutions diminished in the order in which they are numbered. The freshly prepared stannous fluoride solution showed the maximum effect in reducing the extent as well as the number of lesions.

No explanation could be given for the inability of a mixture of stannous chloride and sodium fluoride to equal the effectiveness of a comparable stannous fluoride solution. The lack of correlation between caries protection and fluoride deposition in the bones also was impossible to explain.

It was pointed out that a better understanding of the data presented might have resulted if two additional solutions had been used; that is, a freshly prepared solution of commercial stannous fluoride and a freshly prepared solution of a mixture of stannous chloride and sodium fluoride.

Charles Robert Seward

BETTER DENTAL HEALTH THROUGH WATER FLUORIDATION—A PROGRESS REPORT

Zachary M. Stadt. Bul. Nat. D. A. 12:9 Oct. 1953.

Fluoridation, a proved method for mass partial prevention of dental caries, can be instituted wherever there is a community water distribution system. The evidence demonstrating dental health benefits derived from water-borne fluorides is so abundant that the measure is now endorsed by important international, national and local groups concerned with health.

To ascertain the extent of the dental caries problem in a community, examinations should be made of selected groups. These examinations can be conducted by dentists or dental hygienists provided by the state department of health or by local dentists or dental hygienists employed by the local health department.

The need for fluoridation is clearly shown by the dental caries experience of a group such as the 12 to 14 year old children in Charlotte, N. C. Among Negro children only 4 per cent of teeth attacked by caries were filled, whereas white children of the same ages had almost 50 per cent of their carious teeth filled. There was untreated dental caries in almost 83 per cent of the teeth.

Studies of the results of fluoridation, although varying from study to study, show definite reductions in caries; the youngest groups show the greatest benefits.

The initial cost of fluoridation, covering fluoride feeders, accessories, installation, possibly some laboratory equipment, reagents and the chemical, depends on the size of the town. Sodium silicofluoride is less expensive than sodium fluoride, but its use is limited to dry feed installations.

In most rural areas there are no community water systems. For these persons, numbering

some 55 millions, it may be possible to develop methods to provide fluoridated water for infants and children. More schools of dental hygiene should be established, especially for the training of Negro women. Liberal scholarships should be offered to those who will work at least one year in a topical fluoridation program under state or local health department direction.

Fluoridation may prevent only as much as 50 to 60 per cent of dental caries. Therefore, a sustained program of dental health education must continue to stress the need for a program of early and regular dental care to prevent tooth loss, moderation in the consumption of carbohydrates and the brushing or rinsing of teeth immediately after eating.

Roscoe C. Brown

STUDIES ON DENTAL CARE SERVICES FOR SCHOOL CHILDREN

George E. Waterman and John W. Knutson. Pub. Health Rep. 68:583 June 1953; 69:247 March 1954.

This study was designed to provide actual performance data on the accumulated and maintenance dental care needs of school children.

An average of 4,800 school children, kindergarten through the ninth grade, were given complete dental treatment in each of four treatment series in the Richmond dental care project. These constituted about 85 per cent of the children enrolled in the Richmond schools. Another 6 per cent of all children in the Richmond schools had regular dental care from their own dentists. Seven per cent sought no care at all.

Examination during the first treatment series showed an average of 0.83 filled permanent tooth for children aged 5 to 16. During the fourth series, the corresponding rate was five times as high, or 4.28 per child. Similar comparison for total missing teeth showed an average per child of 0.61 in the first series and 0.29 in the fourth—a reduction of more than half.

In the first treatment series, 6.65 permanent tooth surfaces per child were filled. In the final series, the number of surfaces requiring fillings was only 1.94, or three tenths as many as in the first.

Even with the minimal amount of care given to deciduous teeth, the filled tooth rate per child increased from an average of 0.22 tooth per child, aged 5 to 16, in the first treatment series to 1.25 per child in the fourth treatment series, or more than a fivefold increase.

In the first treatment series, each dentist was able to care for 530 children during the course of a year. At the time of the fourth series, dental needs had been reduced to the point where 1,343 children a year were cared for by 1 dentist. Thus, while an average of 2.88 man-hours of treatment for each child was required in the first treatment series, only 0.75 man-hour was needed in the fourth series. This estimate includes the time required to treat 859 children who had not been treated previously.

With the exception of new patients, permanent teeth required only maintenance care during the last three treatment series. The influence this factor exerts on the average time required to complete treatment for each child is evident from the fact that an average of 2.88 dental man-hours was required to complete treatment during the initial series, when most of the children had a lifetime accumulation of dental defects, as compared with an average of 0.75 dental man-hour in the final series of treatment.

With approximately the same personnel ratio, the number of months to complete each treatment series was 24, 20, 15 and 11 respectively. Naturally, there was an overlap between treatment series when treatment was being provided in two treatment series simultaneously.

The total time of the four treatment series was five years.

DENTAL PUBLIC HEALTH ACCOMPLISHMENTS AND PREDICTIONS

John W. Knutson. Am. J. Pub. Health 44:33 March 1954.

During the ten year period since 1944 the concept of dental public health has been expanding constantly. The early concept was that dental public health should be considered as limited chiefly to education concerning the importance of dental health and to early detection and correction of carious teeth. According to the newer concept, oral health needs are measured by epidemiological "yardsticks." Although education and treatment are still aims of dental public health, emphasis is placed now on the prevention of dental defects.

From an epidemiological standpoint the widely used DMF index is valuable. Of potential usefulness are less known indexes for the classification of malocclusions and the tabulation of periodontal conditions. Specialized programs of service in orthodontic correction and cleft palate treatment and rehabilitation have been developed. Studies

have been made on the time requirements for a complete dental service for school children.

Fluorides have proved to be beneficial in the prevention of dental caries. There has been wide acceptance of water fluoridation. Topical applications of fluoride solutions to the teeth also have been shown to be worth while.

Other programs that have been promoted by dental public health in the past decade are detection of cancer, continuation of professional education, dental health workshops and dental care prepayment plans.

Not the least impressive indication of the growth of dental public health activities during the decade is the growth in numbers and in influence of organizations interested in or established for the promotion of dental health. In this growth lies the basis for the prediction that dental public health of the future will meet the challenge and successfully cope with dental health problems.

Richard C. Leonard

THE GONIAL ANGLE

Elli Jensen and Mogens Palling. Am. J. Orthodont. 40:120 Feb. 1954.

This study is an attempt to evaluate the literature available on the gonial angle, a detail of the mandible which is important in orthodontic diagnosis. The gonial angle is related to planes and angles commonly used by the orthodontists as, for instance, the mandibular base line. Since the angle varies according to the individual's age, race, sex and physique, these factors have to be considered when the diagnosis and prognosis are made for a patient.

The following are some of the main facts concerning the gonial angle:

1. During evolution the gonial angle has decreased from an almost straight line in early reptiles to almost a right angle in anthropoids.
2. The gonial angle in man may vary from 100 degrees to 148 degrees. Its mean angle is greatest in Caucasians; nearly as great in Chinese, Eskimos and Negroes; and smallest in early Caucasians, Australians and American Indians.
3. In all racial groups the mean angle in females is 3 degrees to 5 degrees greater than in males.
4. The wide variation in the size of the gonial angle makes this trait useless for racial or sex classification of mandibles.
5. In well-muscled individuals the mandible is heavier and the gonial angle smaller than in individuals with less muscle mass.
6. Conflicting results are reported when the size of the gonial angle is related to the cephalic index.
7. A mandible with a broad, solid ramus has a smaller gonial angle than a mandible with a slender ramus.
8. Cross-sectional studies indicate an increase in the size of the gonial angle from early embryonic stages to the time of birth and a continuous decrease from birth to old age.
9. A longitudinal study by Brodie indicates that the contour of the mandible in the region of the angle remains the same during the period of three months to eight years.
10. The size of the gonial angle is associated with the proportion between facial height and ramus height.
11. The size of the gonial angle is rather independent of variations in facial development as viewed in the sagittal plane.

William F. Ford

POROSITY IN ACRYLIC TEETH

T. C. Graty. Brit. D.J. 96:13 Jan. 5, 1954.

A method for checking the specific gravity of acrylic teeth was devised by the author to determine the porosity of various teeth. This method was abandoned, however, because of the variability of the constituent parts of acrylic teeth and the introduction of experimental errors due to the variable loss of weight by immersion.

A sectioning method was then employed to determine porosity. Porosity was more visible if, after sectioning, the teeth were dipped into melted black or dark red carding wax and the excess wax was carefully wiped off. A significant degree of porosity was observed in ten popular makes. The most common type of porosity was a single void in the geometric center of the tooth or at the site of the cingulum.

A small central void may have little practical significance; a larger void could be a predisposing factor to breakage in function. Superficial voids may be brought to the surface by the polishing or wearing of the teeth. If the voids escape detection, they may cause an unhygienic condition because of the lodging of bacteria in the voids.

H. O. Beck

FACTORS CONCERNING FULL DENTURES

N. L. Kettlewell. J. Pros. Den. 4:30 Jan. 1954.

The procedure outlined in this article should enable the average dentist to construct satisfactory, serviceable dentures.

Preliminary impressions are made with black compound impression material. The im-

pressions themselves are then made from the preliminary casts with red compound, and the borders are reduced to provide at least 2 mm. clearance from the reflections. The impressions are redeveloped in segments with a low-fusing compound. Flaming of the impression compound is accomplished with a specially designed torch. An impression wax is used to develop the postpalatal seal.

The action of the reflected tissues is controlled by the operator's manipulative procedures except when tongue action is employed to record the action of the muscles on the lingual side of the lower impression. Alginate is introduced into the relieved and perforated compound tray and is placed in the mouth with minimum pressure. Casts are made in artificial stone and prepared for occlusal rims.

Preextraction records are used as aids in determining vertical dimension. These records include a profile roentgenogram with about a 21 foot target-to-film distance.

To achieve satisfactory esthetic results, preextraction impressions are made. The extracted natural teeth are placed in the tooth imprints, and this prepared impression is filled with artificial stone. The casts with the natural teeth can be used for reference purposes and for making reproductions in acrylic or porcelain materials. They may be used also in making "immediate" or "treatment" dentures.

Complete dentures are a "crutch." The patient should be taught his responsibility in the use of this "crutch"; at all times during mastication the patient should keep a bolus of food on both sides of the mouth.

Stephen P. Forrest

THE ORAL MANIFESTATIONS OF LICHEN PLANUS: 50 CASES

B. E. D. Cooke. Brit. D.J. 96:1 Jan. 5, 1954.

The clinical and pathological picture of oral lichen planus presented in this report is based on the analysis of 50 cases and of biopsies from 13 of the cases.

Lichen planus is an inflammatory reaction of the skin and mucous surfaces which on the skin is characterized by an intensely itchy eruption and the presence of angular papules of pink color. The lesion in oral lichen planus is a pearly white papule on an erythematous mucosa. Oral manifestations may occur in conjunction with the skin lesions, but they may occur alone also. When lichen planus involves the mouth, the cheek mucosa is almost invariably affected, and it is the exception to find the gingiva or palate alone affected. The lips are not usually involved. In a tenth of the cases studied there was evidence of skin involvement. In others the manifestations were restricted to the mouth.

The cause of lichen planus is unknown. The persons affected are usually nervous and irritable, and there is frequently a history of some shock, worry or anxiety with insomnia antecedent to the eruption. The differential diagnosis from leukoplakia is important.

In these cases of lichen planus, reassurance that the patient did not have leukoplakia or any lesion that might become a cancer was essential to treatment. No remedy was found that would alter the course of the disease, but any trauma to the mucosa from rough margins of teeth or dentures was dealt with. Cases of the atrophic form of the disease were treated during acute exacerbations with 2 per cent chlortetracycline mouthwashes.

William A. Nolte

THE DEVELOPMENT OF IDEAL OCCLUSION OF THE GUM PADS AND THE TEETH

Sheldon Friel. Am. J. Orthodont. 40:196 March 1954.

There were two objects in this investigation: (1) to see how space was obtained for the permanent incisor teeth and (2) to see what changes, if any, occurred in the occlusion of the posterior teeth from the time of the eruption of the deciduous teeth to the complete eruption of the permanent teeth. Chimpanzee skulls were chosen because their teeth were believed to be more similar to human teeth than those of any other animal.

The stages of occlusion observed were as follows:

1. The position of the gingival pads at birth.
2. The occlusion of the deciduous teeth at two and a half to three years of age.
3. The completion of the "mixed" occlusion (permanent incisors and first permanent molars and cuspids).
4. The completion of the permanent occlusion.
5. The changes that occur as the result of wear.

Some difference of opinion existed as to whether the models should be articulated in occlusion or at rest, with a freeway space left between the gingival pads.

There was evidence that root spacing of the deciduous incisors does take place and also that there is a change in the relation of the mandibular arch and the maxillary arch between three years and eight years of age.

William F. Ford

Deaths

Adams, Samuel T., Tucson, Ariz.; School of Dentistry, Washington University, St. Louis, 1907; died August 7.

Akan-Stamey, Ellen E., Bellingham, Wash.; died March 10; aged 74.

Allen, Jessie M., Philadelphia; Pennsylvania College of Dental Surgery, Philadelphia, 1902; died February 13.

Anderson, Ernest F., Emporia, Va.; Dental School, Harvard University, 1927; died March 20; aged 55.

Andrews, Earl R., Encino, Calif.; College of Dentistry, University of Southern California, 1913; died April 17; aged 64.

Bailey, George H., Scranton, Pa.; School of Dentistry, University of Pittsburgh, 1911; died May 5; aged 69.

Baker, George F., Narberth, Pa.; School of Dentistry, University of Pennsylvania, 1910; died April 21.

Baker, James P., Detroit; College of Dental Surgery, University of Michigan, 1936; died March 18; aged 42.

Barber, Leslie R., Colfax, Wash.; School of Dentistry, North Pacific College of Oregon, 1925; died February 25; aged 56.

Barr, Samuel, Newburgh, N. Y.; New York College of Dentistry, 1915; died April 22; aged 60.

Barton, Walter W., Binghamton, N. Y.; School of Dentistry, University of Pennsylvania, 1898; died March 26; aged 77.

Becker, David, Montclair, N. J.; School of Dentistry, University of Pennsylvania, 1923; died May 6; aged 54.

Beekman, Daniel D., Clarksburg, Md.; Southern Dental College, Atlanta, 1897; died April 29; aged 83.

Bennett, Everett B., Nashville, Tenn.; Chicago College of Dental Surgery, Loyola University, 1929; died April 23; aged 48.

Bernstein, Bernard, New York; New York College of Dentistry, 1905; died April 13; aged 68.

Beuchler, Joseph H., Pittsburgh; School of Dentistry, University of Pittsburgh, 1910; died February 7; aged 63.

Bilek, Joseph B., Chicago; Dental School, Northwestern University, 1902; died April 14; aged 82.

Birkhahn, Alex M., Hewlett, N. Y.; New York College of Dentistry, 1899; died May 3; aged 79.

Black, Dewitt T., Morrilton, Ark.; College of Dentistry, University of Tennessee, 1917; died May 19; aged 60.

Bomberger, Paul E., Lancaster, Pa.; Medico-Chirurgical College of Philadelphia, 1915; died April 9; aged 59.

Bowles, Roy O., Charleston, W. Va.; Baltimore College of Dental Surgery, 1915; died April 17; aged 61.

Boyce, Fred D., Los Angeles; died April 15; aged 83.

Brockett, Lewis E., Brooklyn; School of Dentistry, University of Buffalo, 1906; died April 10; aged 71.

Bugbee, Thales Dwight, White Plains Junction, Vt.; Pennsylvania College of Dental Surgery, Philadelphia, 1899; died March 12; aged 82.

Bull, I. William, Jacksonville, Fla.; School of Dentistry, Vanderbilt University, 1918; died April 1.

Camp, John O., Plantsville, Conn.; Baltimore College of Dental Surgery, University of Maryland, 1912; died April 15; aged 70.

Charal, Constantine G., Chicago; Chicago College of Dental Surgery, Loyola University, 1919; died February 4.

Collacott, Edward A., Howell, Mich.; College of Dental Surgery, University of Michigan, 1917; died March 30; aged 60.

Combs, James Ennis, Visalia, Calif.; Dental Department, Vanderbilt University, 1891; died April 17; aged 89.

Cotter, Edmund J., Meriden, Conn.; School of Dentistry, Georgetown University, 1919; died April 12; aged 58.

Cottingham, Thomas F., Seaford, Del.; Philadelphia Dental College, 1896; died April 10; aged 81.

Creighton, Edgar A., Bridgeboro, N. J.; Medico-Chirurgical College of Philadelphia, 1912; died April 12; aged 64.

Cresmer, Carimon J., Covina, Calif.; College of Dentistry, University of Southern California, 1908; died April 12; aged 69.

Curtis, Harold A., Berkeley, Calif.; College of Dental and Oral Surgery, New York, 1912; died April 25; aged 65.

Davis, Legare S., North, S. C.; Atlanta Dental College, 1911; died May 8; aged 65.

Dinan, Wilfrid I., Amarillo, Texas; Dental School, Northwestern University, 1920; died April 9; aged 60.

Ericson, Arentz J., Fort Dodge, Iowa; College of Dentistry, University of Iowa, 1917; died February 14.

Feldman, Morris H., Brooklyn; New York College of Dentistry, 1909; died April 20; aged 69.

Felling, Albert L., Arlington, N. J.; Dental School, Marquette University, 1923; died April 21; aged 58.

Florence, William M., Cleveland; College of Dentistry, Western Reserve University, 1915; died April 5; aged 66.

Ford, Fred A., Wellesley Hills, Mass.; Baltimore College of Dental Surgery, 1892; died March 27; aged 84.

Friedman, Abedeaux, Tacoma, Wash.; Chicago College of Dental Surgery, Loyola University, 1927; died April 8; aged 48.

Fuller, Marcus A., Springfield, Mass.; died April 1; aged 59.

Golden, Eric H., St. Louis; School of Dentistry, St. Louis University, 1918; died April 13; aged 65.

Grant, Calvin J., Atlanta, Ga.; Atlanta Dental College, 1908; died April 20.

Haley, Joseph M., Kenmore, N. Y.; School of Dentistry, University of Buffalo, 1912; died March 30; aged 70.

Hall, George E., Watertown, Mass.; Dental School, Tufts College, 1924; died in April; aged 59.

Heiny, Albin J., Northwood, Iowa; College of Dentistry, University of Iowa, 1919; died March 12; aged 65.

Henry, David, Medical Lake, Wash.; School of Dentistry, North Pacific College of Oregon, Portland, 1925; died April 12; aged 52.

Herr, George C., Southern Pines, N. C.; School of Dentistry, University of Pennsylvania, 1902; died April 6; aged 72.

Herrman, Alphonse W., Philadelphia; School of Dentistry, University of Pennsylvania, 1899; died February 25; aged 86.

Heyman, George H., Hewlett, N. Y.; New York College of Dental Surgery, 1908; died March 27; aged 65.

Higby, Nelson G., Pomona, Calif.; Ohio College of Dental Surgery, University of Cincinnati, 1899; died April 27; aged 84.

Hisey, Jay M., Painesville, Ohio; College of Dentistry, Western Reserve University, 1910; died March 22; aged 66.

Hofmeister, Howard L., Lennox, S. D.; Chicago College of Dental Surgery, Loyola University, 1911; died February 22; aged 64.

Holmes, Harry S., Holly Hill, Fla.; died April 7.

Howe, Walter G., Portland, Ore.; Dental School, Northwestern University, 1911; died May 4; aged 69.

Hudson, James E., Memphis, Tenn.; College of Dentistry, University of Tennessee, 1905; died March 30; aged 79.

Insell, Benjamin B., New York; New York College of Dentistry, 1919; died March 11.

Jameson, Robert B., New Castle, Pa.; Pittsburgh Dental College, Western University of Pennsylvania, 1901; died February 10; aged 75.

Jessen, Lloyd A., Bayard, N. Mex.; Dental School, Northwestern University, 1915; died April 14; aged 67.

Jones, Thomas W., Coral Gables, Fla.; Southern Dental College, Atlanta, 1916; died April 18; aged 60.

Kesner, Milo M., Le Roy, Kan.; Kansas City-Western Dental College, 1925; died March 20; aged 50.

King, Harvey C., Pittsburgh; Pennsylvania College of Dental Surgery, Philadelphia, 1889; died April 15; aged 86.

Kratz, Charles Q., St. Anne, Ill.; Philadelphia Dental College, 1916; died April 28; aged 59.

Kunka, Stephen T., Chicago; Chicago College of Dental Surgery, Loyola University, 1935; died April 24; aged 43.

Leathe, Wilbur, Jr., Jamaica Plain, Mass.; Dental School, Tufts College, 1936; died February 23; aged 45.

Leaver, Morris H., Quakertown, N. J.; School of Dentistry, University of Pennsylvania, 1899; died April 13; aged 81.

Lederman, Paul B., Cleveland; College of Dentistry, Western Reserve University, 1931; died April 14; aged 46.

Le Mar, Glenn E., Rapid City, S. D.; Omaha Dental College, 1902; died March 11; aged 79.

Lieberman, Milton, South Euclid, Ohio; College of Dentistry, Western Reserve University, 1919; died April 22; aged 58.

McAllister, Thomas H., Portland, Ore.; School of Dentistry, North Pacific College of Oregon, 1923; died May 13; aged 58.

McDonald, Joseph L., Merriam, Kan.; Kansas City Dental College, 1915; died April 20; aged 61.

McKain, Fred E., Joplin, Mo.; Western Dental College, Kansas City, 1919; died April 29; aged 58.

Meredith, Arthur A., Middlebourne, W. Va.; College of Dentistry, Ohio State University, 1904; died April 17; aged 80.

Merker, Harry, New York; College of Dentistry, New York University, 1944; died April 22; aged 33.

Meyer, Joseph C., New York; New York College of Dentistry, 1911; died April 20; aged 68.

Miles, Arthur L., Cambridge, Mass.; Boston Dental College, 1898; died April 5; aged 85.

Mullen, Gerald P., Carbondale, Pa.; School of Dentistry, Temple University, 1940; died April 7; aged 46.

Neely, Luther N., Medina, Tenn.; College of Dentistry, University of Tennessee, 1909; died March 19; aged 72.

Nussbaum, Leon E., Allentown, Pa.; School of Dentistry, University of Pittsburgh, 1927; died April 16; aged 57.

Oglesby, Ewing M., Jacksonville, Fla.; School of Dentistry, Vanderbilt University, 1917; died April 2; aged 60.

Opheim, Martin L., Los Angeles; American College of Dental Surgery, Chicago, 1896; died April 21; aged 85.

Orr, Richard D., Peoria, Ill.; School of Dentistry, St. Louis University, 1917; died March 23; aged 58.

Ory, Oscar J., Garyville, La.; School of Dentistry, Vanderbilt University, 1906; died April 18; aged 68.

Patrick, Harry R., Dodge City, Kan.; Barnes Dental College, St. Louis, 1908; died March 3; aged 73.

Peters, Charles Meade, Toronto, Ohio; School of Dentistry, University of Pittsburgh, 1928; died March 31; aged 64.

Pheneger, Henry N., Philadelphia; Baltimore College of Dental Surgery, University of Maryland, 1897; died April 20; aged 78.

Pike, Charles A., La Canada, Calif.; College of Dentistry, University of Iowa, 1910; died February 5; aged 65.

Pitt, William A., Waukegan, Ill.; Chicago College of Dental Surgery, Loyola University, 1895; died April 22; aged 81.

Proctor, James W., Louisville, Ky.; died April 26; aged 81.

Purdy, John W., Bradfordsville, Ky.; Ohio College of Dental Surgery, University of Cincinnati, 1908; died April 4; aged 71.

Quay, Walter M., Tiffin, Ohio; Ohio Medical College, 1913; died May 11; aged 66.

Resler, Alter S., New York; College of Dental and Oral Surgery, New York, 1917; died April 18.

Riblet, Edward Briggs, New York; College of Dental and Oral Surgery, New York, 1911; died May 14; aged 67.

Rimbach, John W., Easton, Pa.; College of Dental Surgery, University of Michigan, 1927; died April 27; aged 55.

Roberts, George A., Pulaski, Tenn.; Kansas City Dental College, 1897; died April 22; aged 86.

Russell, William S., Oteen, N. C.; School of Dentistry, University of Pittsburgh, 1925; died April 4; aged 51.

Sadler, Ralph E., Lakewood, Ohio; School of Dentistry, Western Reserve University, 1902; died April 8.

Sager, Homer A., Kansas City, Kan.; Kansas City Dental College, 1905; died March 14; aged 73.

Shaw, Harry V., Wheaton, Ill.; College of Dentistry, University of Illinois, 1905; died February 28; aged 72.

Shepard, William, Alameda, Calif.; College of Dentistry, University of California, 1901; died April 11; aged 76.

Short, E. David, New York; College of Dental and Oral Surgery, New York, 1905; died April 21.

Sillers, Earl D., Tulsa, Okla.; Colorado College of Dental Surgery, 1922; died April 23; aged 53.

Smith, Hiram N., Harrisburg, Ark.; Barnes Dental College, St. Louis, 1912; died May 8; aged 68.

Squires, Raymond E., Piper City, Ill.; Chicago College of Dental Surgery, Loyola University, 1915; died February 22; aged 61.

Stoddard, Arthur H., Holliston, Mass.; Dental School, Harvard University, 1887; died January 22.

Sturgeon, Harold S., Los Angeles; College of Dentistry, University of Southern California, 1924; died May 17; aged 58.

Sugg, Thomas J., Carrollton, Mo.; School of Dentistry, Washington University, St. Louis, 1905; died April 11; aged 73.

Wagner, Homer C., Huntington, W. Va.; College of Dentistry, Ohio State University, 1918; died April 12.

Walter, Harvey B., Everett, Wash.; School of Dentistry, University of Pennsylvania, 1924; died March 19; aged 57.

Weber, Ward G., Milwaukee; Dental School, Marquette University, 1936; died April 1; aged 40.

Welborne, Roy L., Belton, S. C.; Atlanta - Southern Dental College, 1924; died April 8; aged 62.

Weston, Edith Keyes, Fresno, Calif.; College of Dentistry, University of California, 1923; died April 18; aged 64.

White, John W., Council Grove, Kan.; Kansas City Dental College, 1901; died April 26; aged 82.

Williams, George T., Seattle; Pittsburgh Dental College, Western University of Pittsburgh, 1903; died April 25; aged 80.

Wilson, Lyle C., Checotah, Okla.; College of Dentistry, University of Iowa, 1916; died March 30; aged 60.

Wollison, Hammon L., New Bedford, Mass.; Dental School, Tufts College, 1917; died April 6; aged 60.

Wood, Charles Porter, Detroit; Department of Dental Surgery, Detroit College of Medicine, 1895; died April 26; aged 84.

Wright, William T., Jr., Bethesda, Md.; Baltimore College of Dental Surgery, 1914; died March 20; aged 62.

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Announcements

MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

Ninety-Fifth Annual Session	Nov. 8-11, 1954	Miami, Fla.
Ninety-Sixth Annual Session	Oct. 17-20, 1955	San Francisco
Ninety-Seventh Annual Session	Oct. 1-4, 1956	Atlantic City, N. J.

MEETINGS OF CONSTITUENT SOCIETIES

State	Date	Place	Secretary	Address
Alabama	Apr. 4, 5, 1955	Birmingham	F. A. Finney, Jr.	1045 Forrest Ave., Gadsden
Alaska	Aug. 2-5	Anchorage	C. J. Pearson	500 K St., Anchorage
Arizona			R. W. Christensen	17 E. Weldon Ave., Phoenix
Arkansas			D. M. Hamm	Box 89, Clarksville
California	Apr. 16, 1955	San Francisco	L. R. Ludwigsen	450 Sutter St., San Francisco
S. California	May 9-11, 1955	Los Angeles	J. P. Bowers	124 W. Lime Ave., Monrovia
Colorado	Oct. 3-6	Colorado Springs	W. R. Humphrey	724 Republic Bldg., Denver
Connecticut	May 18-20, 1955	Hartford	E. S. Arnold	37 Linnard Rd., W. Hartford
Delaware	Dec. 8	Wilmington	R. J. Zurkow	152 S. State St., Dover
District of Columbia			Z. B. Lloyd	2007 R St., N.W., Washington
Florida	Apr. 24-27, 1955	Jacksonville	J. E. Edwards	152 Alhambra Circle, Coral Gables
Georgia	Oct. 10-13	Atlanta	J. W. Yarbrough	Bibb Bldg., Macon
Hawaii	June 15-18, 1955	Honolulu	H. H. Dawe	810 N. Vineyard St., Honolulu
Idaho		Coeur d'Alene	F. O'Halloran	Box 703, Coeur d'Alene
Illinois	May 9-12, 1955	Peoria	P. W. Clopper	623 Jefferson Bldg., Peoria
Indiana	May 16-18, 1955	Indianapolis	D. C. Barnhill	400 Bankers Trust Bldg., Indianapolis
Iowa	May 1-4, 1955	Des Moines	H. I. Wilson	639 Insurance Exchange Bldg., Des Moines
Kansas	May 15-18, 1955	Kansas City, Mo.	F. A. Richmond	861 Brotherhood Bldg., Kansas City
Kentucky	Apr. 18-21, 1955	Louisville	A. B. Coxwell, Jr.	1976 Douglas Blvd., Louisville
Louisiana	Apr. 13-16, 1955	New Orleans	J. S. Bernhard	2515 Line Ave., Shreveport
Maine			S. M. Gower	Box 27, Skowhegan
Maryland			E. L. Pessagno, Jr.	415 Medical Arts Bldg., Baltimore
Massachusetts	May 1-4, 1955	Boston	H. E. Tingley	12 Bay State Road, Boston
Michigan	Apr. 18-20, 1955	Detroit	F. Wertheimer	Michigan Dept. of Health, Lansing
Minnesota	Mar. 28-30, 1955	Minneapolis	C. V. E. Cassel	225 Hamm Bldg., St. Paul
Mississippi			B. A. Cohen	306 Plaza Bldg., Jackson
Missouri	May 15-18, 1955	Kansas City	E. D. Suggett	201 Merchants Bank Bldg., Jefferson City
Montana	May 5-7, 1955	Bozeman	E. G. Vedova	Roundup
Nebraska	Apr. 25-28, 1955	Lincoln	F. A. Pierson	1112 Federal Securities Bldg., Lincoln
Nevada			O. M. Seifert	506 Humboldt St., Reno
New Hampshire			F. E. Williams	814 Elm St., Manchester
New Jersey			J. G. Carr	407 Cooper St., Camden
New Mexico	May 22-25, 1955	Ruidoso	J. S. Ellar	Medical Arts Square, Albuquerque
New York	May 16-18, 1955	New York	C. A. Wilkie	1 Hanson Place, Brooklyn
North Carolina			R. D. Coffey	Kibler Bldg., Morganton
North Dakota			V. B. Keltgen	517 de Lendrecie Bldg., Fargo
Ohio	Oct. 17-20	Cincinnati	E. G. Jones	185 E. State St., Columbus
Oklahoma	Apr. 20, 1955	Tulsa	S. A. Russman	809 Medical Arts Bldg., Oklahoma City
Oregon	Mar 7-9, 1955	Portland	T. D. Holder	308 Selling Bldg., Portland
Panama Canal Zone			A. L. Teitel	Box D, U.S. Naval Station, Rodman
Pennsylvania	Oct. 4-6	Pittsburgh	M. D. Zimmerman	217 State St., Harrisburg
Puerto Rico	Jan 26-29, 1955	San Juan	L. de Jesus	Box 624, San Juan
Rhode Island	Jan. 1955	Providence	B. C. Friedman	2 Ayrault St., Newport
South Carolina	May 22-24, 1955	Charleston	J. R. Owings	7 Medical Court, Greenville

State	Date	Place	Secretary	Address
South Dakota			L. N. Thelen	310A W. 18th St., Sioux Falls
Tennessee	May 8-12, 1955	Nashville	A. M. Ballentine	Pulaski
Texas	May 1-5, 1955	San Antonio	W. Ogle	3607 Gaston Ave., Dallas
Utah	Apr. 1955		R. C. Dalgleish	124 State Capitol Bldg., Salt Lake City
Vermont		Woodstock	W. J. Reardon	18 Madison St., Rutland
Virginia	Apr. 29-May 6, 1955	Havana, Cuba	W. T. McAfee	705 Colonial National Bank Bldg., Roanoke
Washington	Mar. 24-26, 1955	Seattle	W. B. Martin	Medical-Dental Bldg., Seattle
West Virginia			G. N. Casto, Jr.	710½ Lee St., Charleston
Wisconsin	Apr. 25-27, 1955	Milwaukee	A. E. Kopp	Wells Bldg., Milwaukee
Wyoming	June 1955	Cheyenne	T. J. Drew	State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	Date	Place	Secretary	Address
Alabama			W. L. McCarty	200 Professional Center, Montgomery
Alaska			R. H. Williams	Box 2122, Juneau
Arizona			R. K. Trueblood	107 East A Ave., Glendale
Arkansas			H. O. Weatherly	205 Halter Bldg., Conway
California			K. I. Nesbitt	507 Polk St., San Francisco
Colorado			J. M. Peabody	724 Republic Bldg., Denver
Connecticut			C. G. Brooks	302 State St., New London
Delaware			P. K. Musselman	143 W. Main St., Newark
District of Columbia			W. T. Birthright	Suite 718, 1835 Eye St., N.W., Washington
Florida			A. W. Kellner	P. O. Box 155, Hollywood
Georgia			S. H. Yarbrough	12 Medical Arts Bldg., Columbus
Hawaii	Sept. 1-6‡	Honolulu	H. L. Houvener	427 Dillingham Bldg., Honolulu
Idaho			R. E. Blickenstaff	1023 Fourth St., S., Nampa
Illinois			W. A. McKee	503 Wood Bldg., Benton
Indiana			C. A. Frech	504 Broadway, Gary
Iowa	May 23-27, 1955‡		D. J. FitzGerald	615 Brick & Tile Bldg., Mason City
Kansas			G. L. Teall	Box 71, Hiawatha
Kentucky			R. M. Justice	1330 Central Ave., Ashland
Louisiana			R. C. Steib	833 Maison Blanche Bldg., New Orleans
Maine			R. A. Derbyshire	Box 387, Skowhegan
Maryland	Nov. 29-Dec. 1		H. Levin	3429 Park Heights Ave., Baltimore
Massachusetts	Jan. 23-29, 1955		G. J. Fink	Rm. 33, State House, Boston
Michigan	June 5-11, 1955	Ann Arbor	J. L. Champagne	3714 W. McNichols Road, Detroit
Minnesota	Jan. 10-14, 1955*† June 13-17, 1955*†		M. G. Walls	1470 Lowry Medical Arts Bldg., St. Paul
Mississippi	Jan. 4-6, 1955‡ June 21-23, 1955‡	Jackson	J. C. Boswell	508 Lamar Life Bldg., Jackson
Missouri			R. R. Rhoades	414 Central Trust Bldg., Jefferson City
Montana		Helena	V. J. Quinn	301 Phoenix Bldg., Butte
Nebraska			H. E. Weber	1210 Federal Securities Bldg., Lincoln
Nevada	Dec. 6	Las Vegas	R. Whitehead	Suite 6, Masonic Temple, Reno
New Hampshire	Dec. 12	Concord	S. G. Markos	8 Renaud Ave., Dover
New Jersey			W. A. Wilson	150 E. State, Trenton
New Mexico			J. J. Clarke, Sr.	Artesia
New York			D. W. Beier	23 S. Pearl St., Albany
North Carolina			F. O. Alford	1109 Liberty Life Bldg., Charlotte
North Dakota			A. L. Pushor	Lisbon
Ohio			H. B. Smith	322 E. State St., Columbus
Oklahoma			R. P. Keidel	403 Surety Bldg., Muskogee
Oregon	Dec. 16-18	Portland	F. L. Utter	506 Pioneer Trust Bldg., Salem
Pennsylvania			A. M. Stinson	Dept. of Public Instruction, Box 911, Harrisburg
Puerto Rico			J. Mercado C.	Box 3717, Santurce
Rhode Island			F. M. Hackett	267 Academy Ave., Providence
South Carolina			T. C. Sparks	1315 Pickens St., Columbia
South Dakota			H. T. Aker	Canton
Tennessee			C. R. Aita	609 Bennie Dillon Bldg., Nashville
Texas			R. T. Weber	312 Capital National Bank Bldg., Austin

State	Date	Place	Secretary	Address
Utah			N. E. Munk	201 Cache Valley Bank Bldg., Logan
Vermont			P. M. Fitch	Newport
Virginia			J. M. Hughes	715 Medical Arts Bldg., Richmond
Washington			M. L. Mower	National Bank of Commerce Bldg., Olympia
West Virginia			C. A. Laughlin	613 Prunty Bldg., Clarksburg
Wisconsin			S. F. Donovan	Tomah
Wyoming			W. A. Hocker	212 O & S Bldg., Casper

*Dental examination. †Dental hygiene examination. ‡Write to secretary of dental examining board for information on locations of examinations. §Approximate dates—verify with state dental examining board.

MEETINGS OF OTHER ORGANIZATIONS

Name	Date	Place	Secy. or Chm.	Address
American Academy of Dental Medicine	Dec. 5	New York	W. M. Greenhut Secy.	124 E. 84th St., New York
American Academy of Gold Foil Operators	Nov. 6	Miami, Fla.	G. D. Stibbs Secy.	School of Dentistry, University of Washington, Seattle
American Academy of the History of Dentistry	Nov. 4	Miami, Fla.	H. L. Faggart Secy.	2120 Pine St., Philadelphia
American Academy of Implant Dentures	Nov. 6, 7	Miami, Fla.	E. J. Kresse Secy.	312 17th St., Denver
American Academy of Oral Roentgenology	Nov. 6	Miami, Fla.	E. A. Bourassa Secy.	1033 Medical and Denta Bldg., Seattle
American Academy of Periodontology	Nov. 4-6	Miami Beach, Fla.	C. E. Chamberlain Secy.	115 North St., Peoria, Ill.
American Association of Dental Examiners	Nov. 5, 6	Miami, Fla.	C. A. Bumstead Secy.	924 Stuart Bldg., Lincoln, Neb.
American Board of Dental Public Health	Nov. 4, 5	Miami, Fla.	P. E. Blackerby, Jr. Secy.	250 Champion St., Battle Creek, Mich.
American College of Dentists	Nov. 7	Miami, Fla.	O. W. Brandhorst Secy.	4221 Lindell Blvd., St. Louis
American Dental Assistants Association	Nov. 8-11	Miami, Fla.	M. L. Martin Exec. Secy.	410 First National Bank Bldg., LaPorte, Ind.
American Dental Society of Anesthesiology	Nov. 6, 7	Miami, Fla.	J. H. Mervis Secy.	510 Walnut St., Clairton, Pa.
American Denture Society	Nov. 5, 6	Miami Beach, Fla.	A. L. Roberts Secy.	Aurora National Bank Bldg., Aurora, Ill.
American Institute of Dental Medicine	Oct. 31-Nov. 4	Palm Springs, Calif.	M. G. Lewis Exec. Secy.	2240 Channing Way, Berkeley, Calif.
American Public Health Association	Oct. 11-15	Buffalo	R. M. Atwater Exec. Secy.	1790 Broadway, New York
American Society of Oral Surgeons	Nov. 3-6	Hollywood, Fla.	R. F. Whalen Exec. Secy.	1112 E. Clay St., Richmond, Va.
Ark-La-Tex Dental Congress	Aug. 16	Shreveport, La.	M. Monsour Chm.	Medical Arts Bldg., Shreveport, La.
Austrian Dental Convention	Sept. 23-25	Innsbruck Austria	F. Fischer Secy.	Tirolean Dental Society, Anichstrasse 35/1, Innsbruck, Austria
Chicago Dental Society	Feb. 6-9, 1955	Chicago	K. S. Richardson Exec. Secy.	30 N. Michigan Ave., Chicago
Council on Dental Education, Dental Aptitude Tests	Oct. 1, 2		S. Peterson Secy.	222 E. Superior St., Chicago
Denver Dental Association Midwinter Meeting	Jan. 9-12, 1955	Denver	B. Kletzky Secy.	724 Republic Bldg., Denver
Eastern Ontario Dental Association	Sept. 19-21	Kingston, Ontario, Can.	M. M. Derrick Secy.	183 Metcalfe St., Ottawa, Ontario, Can.
Greater New York Dental Meeting	Dec. 6-10	New York	M. Purdy Exec. Secy.	Rm. 106A, Hotel Statler, New York
Italian Congress of Dentistry and Stomatology Twenty-ninth Congress	Sept. 13-18	Venice, Italy	U. Saraval Dir.	Campo Manin 4017, Venice, Italy
Journees Dentaires de Paris	Nov. 24-28	Paris, France	J. Ouvrard Secy. Gen.	33, Av. Pierre, 1er, De-Serbie, Paris

Name	Date	Place	Secy. or Chm.	Address
Mid-Continent Dental Congress	Nov. 28-Dec. 1	St. Louis	J. E. Brophy Exec. Secy.	8013 Maryland Ave. St. Louis
Middle Atlantic Society of Orthodontists	Oct. 3-5	Atlantic City, N. J.	G. A. Devlin Secy.	49 Bleeker St., Newark, N. J.
National Board of Dental Examiners	Dec. 6, 7		G. J. Casey Secy.	222 E. Superior St., Chicago
New England Dental Society	Oct. 20, 21	Boston	F. L. Finley, Jr. Secy.	43 Farmington Ave., Hartford, Conn.
Northeastern Society of Orthodontists	Oct. 25, 26	Buffalo	W. J. Prezzano Secy.	Medical Centre, White Plains, N. Y.
Seventh New Orleans Dental Conference	Oct. 24-27	New Orleans	V. B. Marquez Secy.	2213 S. Carrollton Ave., New Orleans
Southern Society of Orthodontists	Oct. 31-Nov. 3	Washington, D. C.	M. D. Edwards Secy.	132 Adams Ave., Montgomery, Ala.
Southwestern Society of Orthodontists	Oct. 10-13	Oklahoma City	F. A. Boyd Secy.	1502 N. Third St., Abilene, Texas

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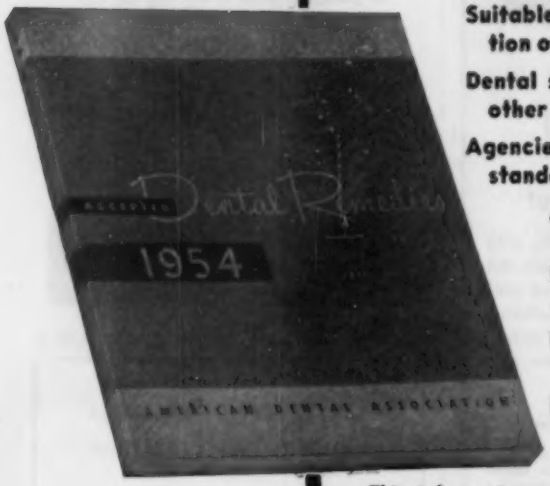

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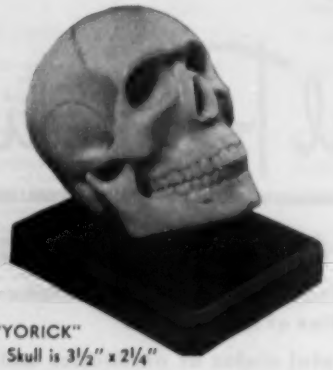

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Hotel reservation application

95th Annual Session
American Dental Association
Nov. 8-11, 1954
Miami, Florida

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Be sure to indicate your arrival time in Miami. Reservations will be held only until 6 p.m. of the day you indicate for your arrival in Miami. Failure to notify the hotel of any last minute change in your arrival time may result in cancellation of the reservation.

Names of all persons who intend to occupy the accommodations must be listed on the application.

List four choices of hotels. Confirmation will be sent to the applicant indicating which hotel has accepted the reservation.

Write the A.D.A. Housing Bureau in Miami if you wish to cancel the reservation.

A.D.A. Housing Bureau • 320 N.E. Fifth Street, Miami, Florida

(Please print or type) A.D.A.

Applicant:

Name_____

_____
(Street address) (City) (Zone) (State)

Arrival in Miami_____ a.m. / p.m. Leaving_____

Accommodations:

Hotel_____ Hotel_____
(First choice) (Third choice)

Hotel_____ Hotel_____
(Second choice) (Fourth choice)

☐ Single occupancy, rate to range from $_____ to $_____ per day.
☐ Double occupancy, double bed, rate to range from $_____ to $_____ per day.
☐ Double occupancy, twin beds, rate to range from $_____ to $_____ per day.
} 2 names must be listed below
☐ Suite of_____ rooms, including parlor, rate to range from $_____ to $_____ per day.

Occupants: (use an extra page for listing additional names if necessary)
Room will be occupied by:

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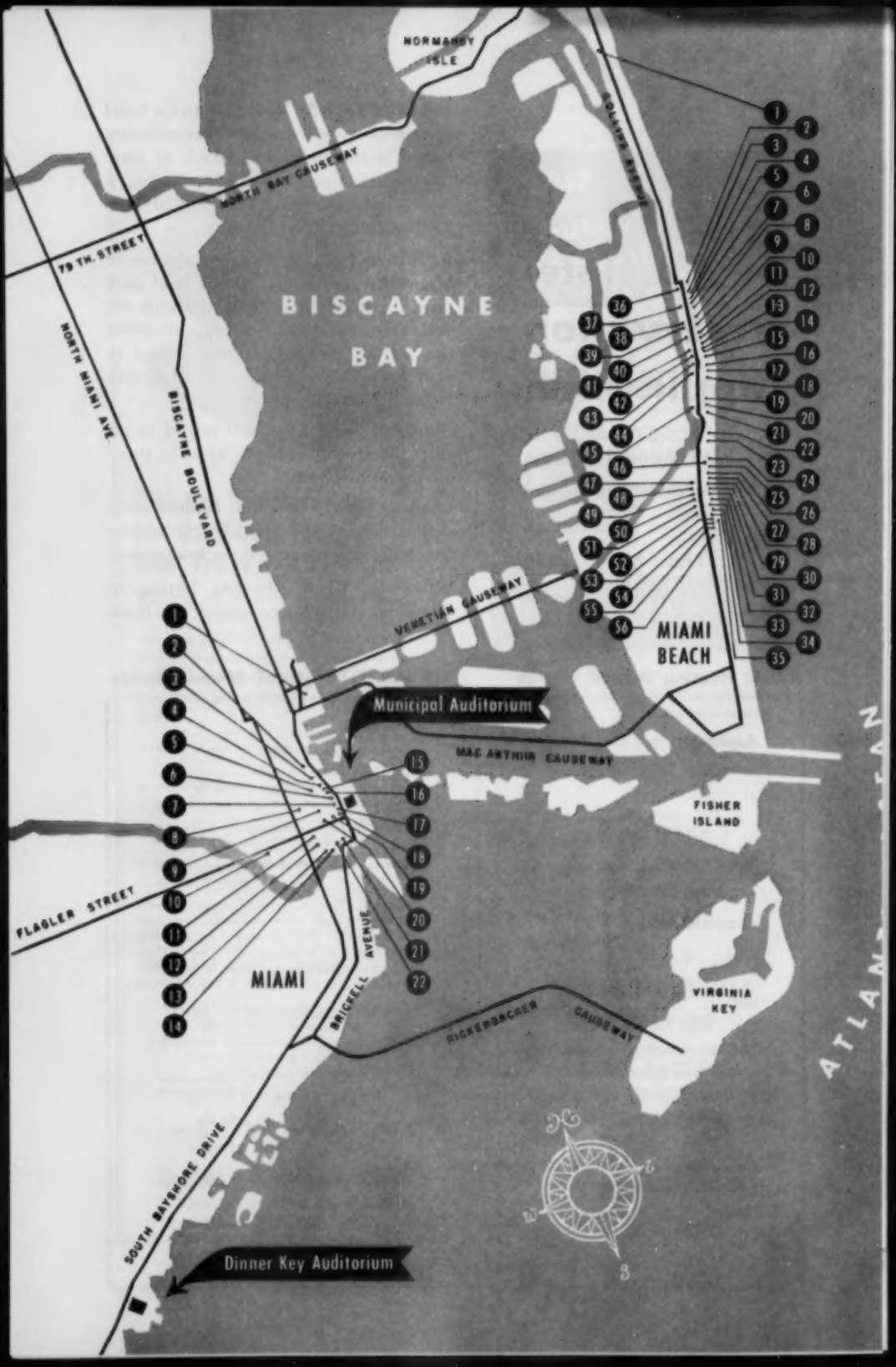
(Name) (Address) (City) (State)

_____
(Name) (Address) (City) (State)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Hotels in **MIAMI**

Key no.	Hotel	Single	Double
2	Alcazar	$5.00	$6.00-$ 7.00
11	Alhambra		7.00
9	Belfort	5.00	6.00- 7.00
16	Berni		5.00- 7.00
5	Biscayne Terrace	8.00	10.00- 14.00
7	Columbus	6.00- 7.00	8.00- 12.00
8	Cortez	4.00	5.00- 7.00
12	Dallas Park		10.00
10	El Comodoro	5.00- 6.00	8.00- 12.00
15	Everglades	5.00- 8.00	8.00- 12.00
17	Leamington		6.00- 7.00
3	Liberty		6.00
18	McAllister	5.00- 7.00	8.00- 12.00
6	Miami Colonial	5.00- 6.00	8.00- 10.00
19	Paramount		6.00- 8.00
21	Patricia	5.00	7.00
4	Plaza	5.00	7.00- 8.00
20	Ponce de Leon	8.00	10.00- 12.00
14	Robert Clay	5.00- 6.00	5.00- 7.00
22	Towers	4.00	6.00
13	Tuttle		6.00
1	Venetian	5.00- 6.00	6.00- 8.00

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Key no.	Hotel	Single	Double
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21	Atlantis	5.00	6.00
22	Belmar	8.00	10.00- 12.00
20	Billows		6.00
9	Cadillac		6.00- 8.00
43	Capri	6.00	8.00
11	Caribbean	6.00	8.00
50	Catalina		5.00- 6.00
40	Claridge	3.00	5.00
37	Continental	4.00	5.00
27	Cromwell	6.00	8.00
38	Croydon Arms	5.00	6.00
45	Del Prado	5.00	6.00- 8.00
53	Delano		10.00
56	di Lido		10.00- 14.00
47	Dorchester	4.00	5.00
41	El Morocco	5.00	8.00
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12	Ocean Grande	4.00	5.00- 7.00
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16	Robert Richter	6.00	8.00
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6	San Marino	8.00	10.00
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35	Surfcomber	8.00	10.00
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NEBRASKA—For sale. Fully equipped dental office, lease available, good location. Reason for selling, death. Contact Mrs. F. W. Leonard, 2821 20th St., or Mr. J. O. Peck, Columbus, Nebraska.

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WASHINGTON—For sale. Dental office in home on salt water property in exclusive residential district. Practice of deceased dentist established over 25 years. Excellent fishing and boating facilities. Mrs. Arland Houck, 5236-40th Ave., W., Seattle 99, Wash.

LOCATIONS AVAILABLE

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CALIFORNIA—Wanted dentist. California licensed. Progressive community 15,000, practice assured. Architect-designed dental suite available. Address A.D.A. Box No. 638.

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ILLINOIS—Wanted dental hygienist, County Health Department, $300 per month, car furnished, three weeks' vacation, sick leave. Further information available from A. L. Hildinger, M.D., Medical Director, Jo Daviess County Health Department, 123 S. Main, Galena, Ill.

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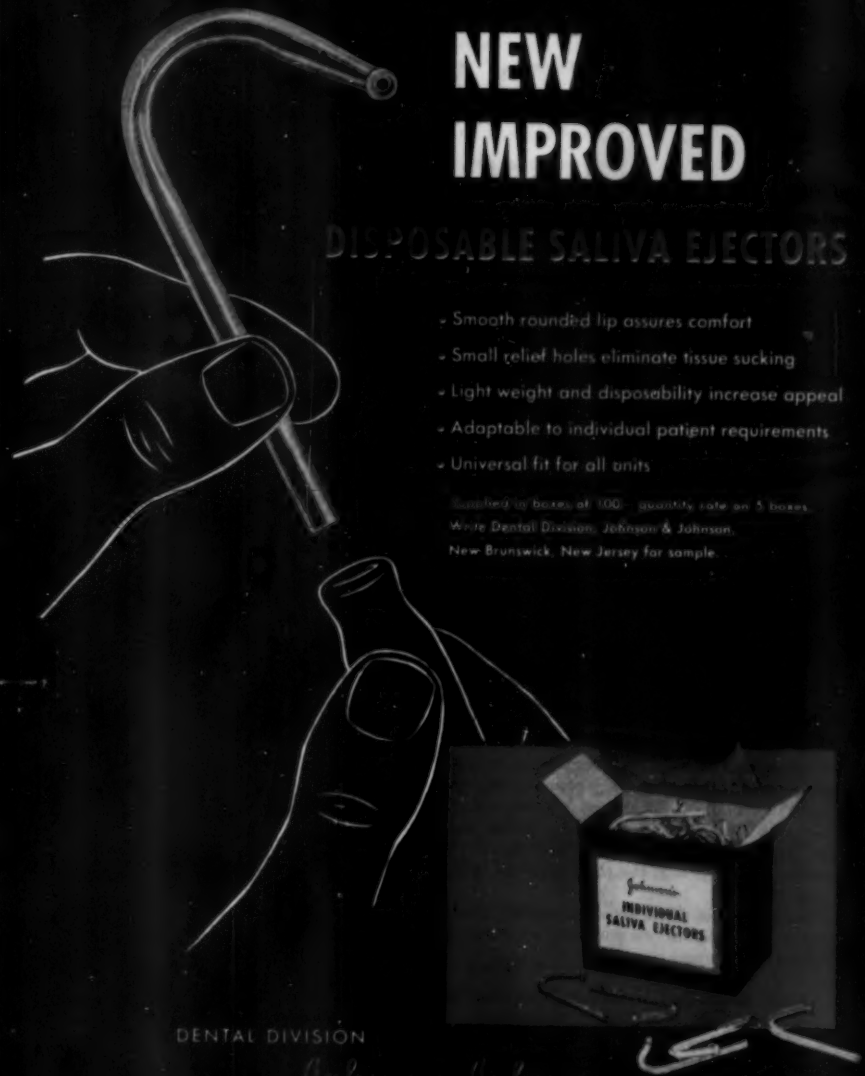

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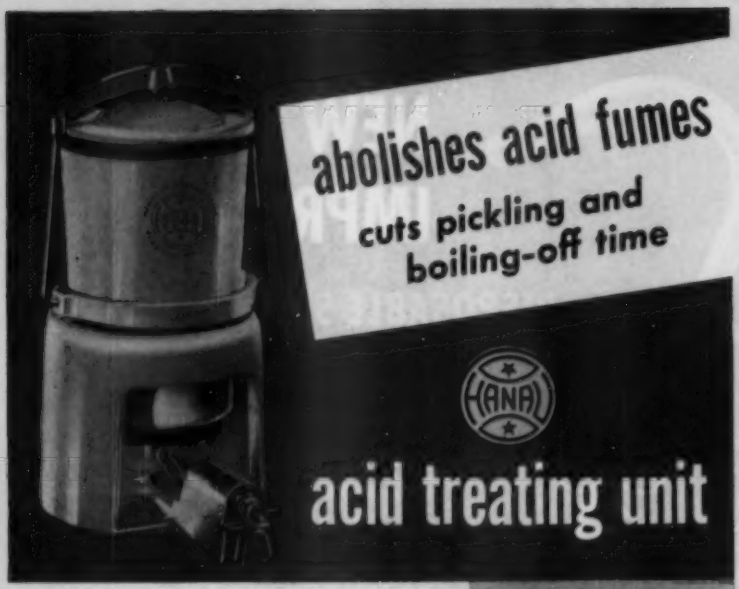

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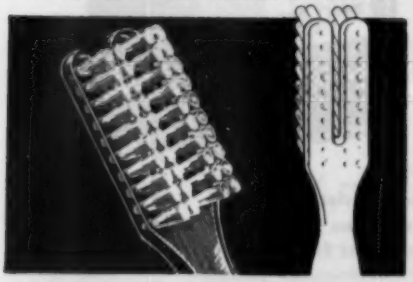

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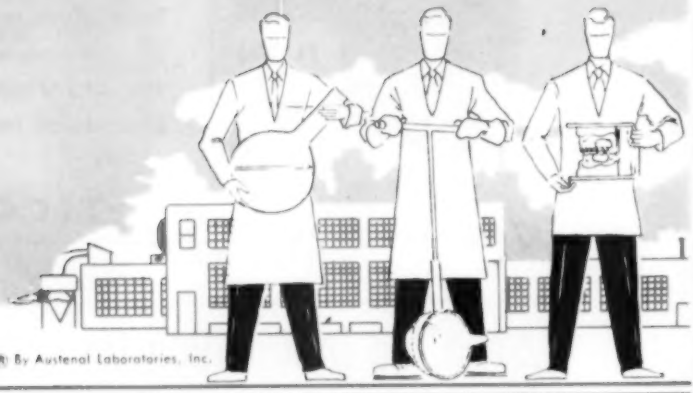

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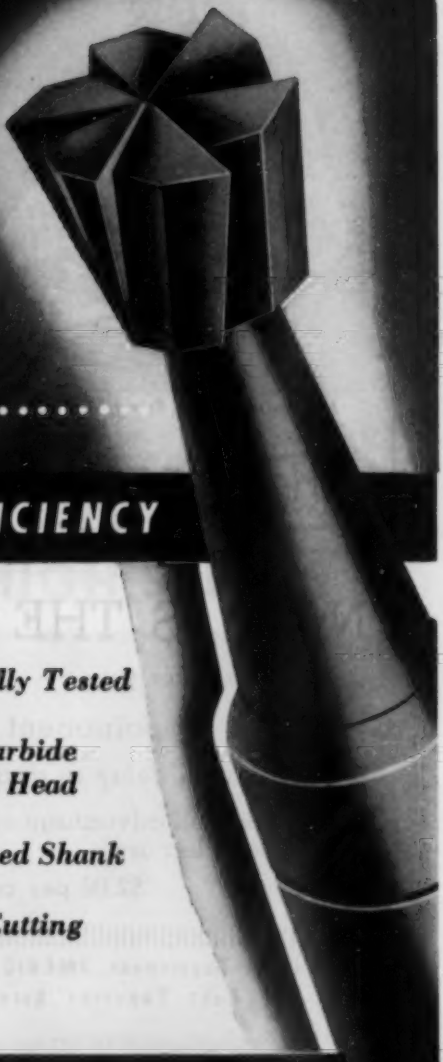

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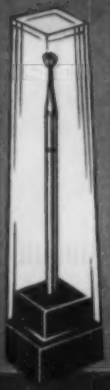

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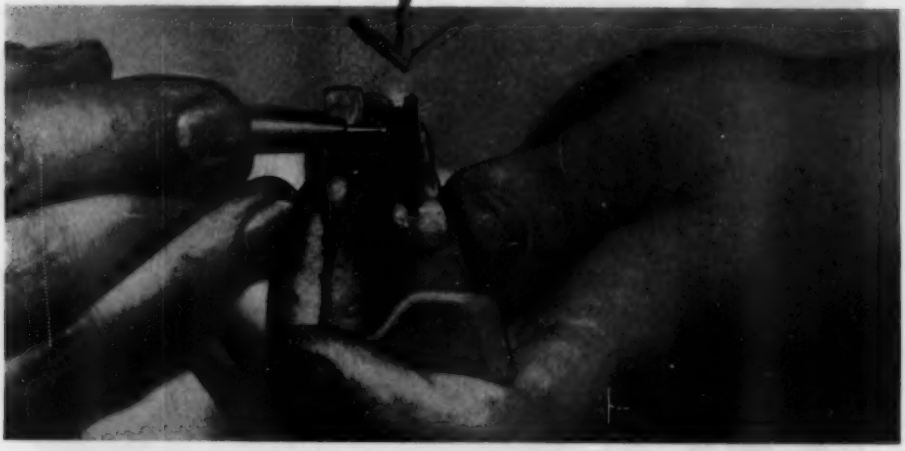

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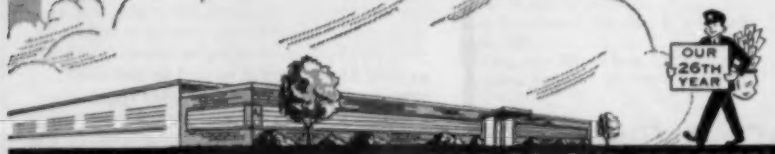

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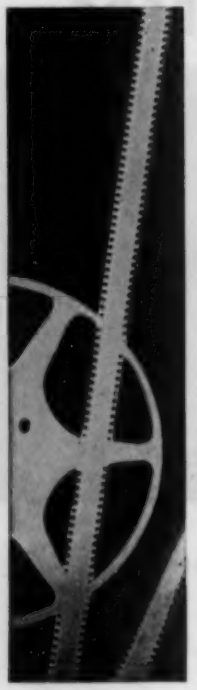

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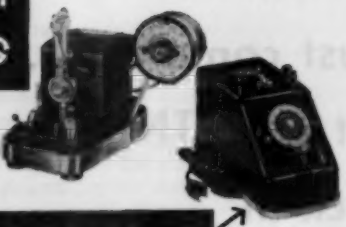


or Model 5A Black

into a bright

white up-to-the-minute

WIG-L-BUG

like ←this

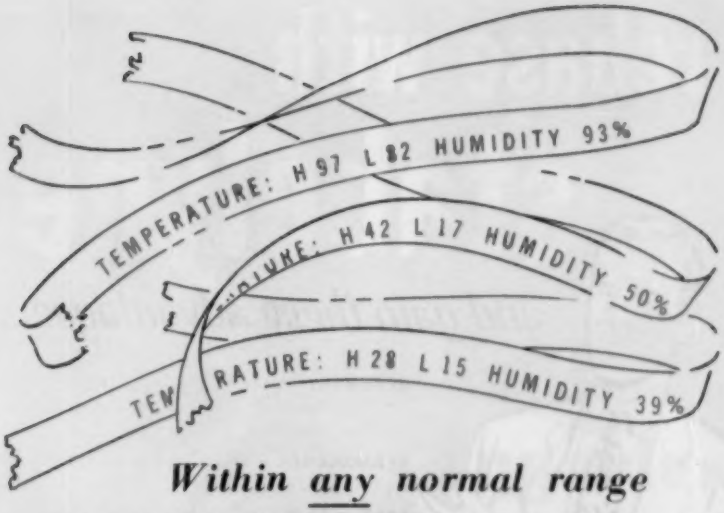
Have us modernize your old Model 3A Wig-l-bug. We check and clean thoroughly. We replace the mechanical timer with a new electric timer. We completely overhaul the motor, supply new wires where required. And we remount the mechanism in a beautiful, bright, white bakelite housing. This offer only to 110 volt, 60 cycle machines . . . Costs only $27.50, F.O.B. Factory.

You can turn your Model 5A Black Wig-l-bug into a Model 5A WHITE by simply changing the housing...or having your dealer salesman do it for you. White Case only $10.00, F.O.B. Factory. If Black Case is returned a credit of $5.00 is allowed against above price.

At present the change-over from Model 3A to 5A White takes about 10 days. If you don't have a Wig-l-bug, you can order one for prompt shipment, Black $55.50, White $60.50.

CRESCENT DENTAL MFG. CO.

1839 S. Pulaski Road, Chicago 23, Illinois



Within any normal range of temperature and humidity . . .

SYNTREX behaves with uniform efficiency!

A new advance in silicates! Within any reasonable limits of temperature and humidity, Syntrex mixes and sets uniformly. It allows ample placement time . . . then provides *snap-setting* to speed finishing. Ten shades make color-matching quick and easy.

In Syntrex, silicate science reaches its pinnacle. Never before has a silicate filling material offered such flexible manipulation or such durable restorations!

For modern materials call on **Caulk**

MILFORD, DELAWARE

rebase with stabelyne

and gain these advantages...

ACCURACY – a perfect reproduction of the denture-bearing area – complete comfort for the patient.

PERMANENCE – Stabelyne is as permanent as a processed denture.

EASE and SPEED – air bubbles and porosity eliminated by pre-mixing – has the texture of soft compound – much quicker and easier to use.

MORE PLEASANT – not messy or sticky – much more pleasant for the patient from all standpoints.

CRYSTAL CLEAR – no granulation.

ADEQUATE working time.

STABELYNE is available in one-unit or 10-unit packages, to suit *your* requirements.

Order from your dental dealer TODAY!

dental perfection co. 543 West Arden Ave. Glendale 3, Calif.

Also hospital policies
for members and their families

$4,000,000 Assets

$20,000,000 Claims Paid

52 YEARS OLD

Physicians Casualty & Health Ass'ns.

Omaha 2, Nebraska

for
caries-active
patients
prescribe

Amurol

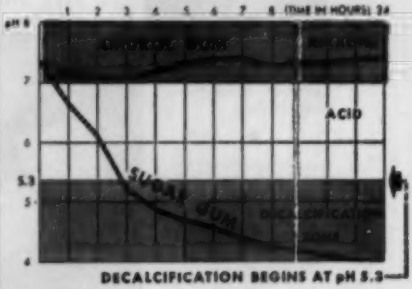
NON-CARIOGENIC

Sugarless Gum

Sold through drug, department and health food stores. Samples and literature on request. Please give druggist's name, address.

AMUROL PRODUCTS COMPANY
116 S. MICHIGAN AVE., CHICAGO 3, ILL.

Comparative Effects of Sugar Gum and Amurol Gum on pH of Saliva



As shown above, pH of caries-active saliva remains in alkaline zone for hours with AMUROL SUGARLESS GUM, whereas with sugar gum the pH drops to the acid level under the same conditions.

RICHMOND ALL-COTTON ROLL
EASIER TO USE

MORE ABSORBENT
—carefully selected cotton held securely by spiral winding. Lengthwise fibers give wick-like action—absorb more, hold more.

MORE CONVENIENT
—bends easier, fits snugly, keeps field drier. Can be cut any length for special need—spiral winding holds shape.

MORE COMFORTABLE
—patients appreciate the softness and flexibility. Richmond rolls do not stick to oral mucosa like starchy rolls—are always gentle and non-irritating.

sizes	large		medium		small
diameter	½"		¾"		5/16"
length	1½"	6"	1½"	6"	6"
no. per box	1000 2000	500 1000	1000 2000	500 1000	500

Sterilized after packaging.
Write for generous testing sample.

RICHMOND DENTAL COTTON CO.
BOX 2176 • CHARLOTTE 1, NORTH CAROLINA

"Manufactured Where Grown"

Enlargement shows the *lengthwise* fibers and the ingenious self-sealing spiral winding.

●

Richmond Dental makes both *sterile* and *non-sterile* EXODONTIA SPONGES. Convenient and economical, highly absorbent. Write for samples.

The *protective coloration* with which nature endows creatures such as the pheasant in this illustration, hides it in its own environment—this, despite the brilliance of its plumage which is used in actual fact as its device for self-concealment.

Nature's principle of protective coloration has been adapted for Densene "33" Varihued Denture Plastic. Its variegated colors are an integral part of the material. They are dispersed naturally and diffused through-and-through the denture as the material is mixed and cured. The Varihued Denture conceals itself *by creating the illusion of "living tissues."* It cannot be detected in the mouth, even under close scrutiny.

Use or specify Densene "33" Varihued for your next case . . . observe it *in the patient's mouth . . . hear it praised!*

AVAILABLE THROUGH YOUR DEALER

DENSENE "33"

Varihued

DENTURE PLASTIC

RINN Developer and Fixer CONCENTRATES with PHENIDONE

Finest Results EVER!

There's NO Metol in Rinn's new Developer, but instead this top-flight photographic agent. Phenidone was first prepared as early as 1890 . . . later its wonderful action as a photographic agent was discovered. But, *only now* has it become practical to manufacture it. Its behavior is amazing; it's truly revolutionary . . . another Rinn product to bring you finer radiographic results.

OUTSTANDING CHARACTERISTICS of PHENIDONE

High concentration possible. Result: more brilliant radiographs.

Less staining fingers and clothing.

Eliminates skin rash or metol poisoning.

Will not discolor as rapidly with age (PHENIDONE has a tendency to retard oxidation.)

It will develop more films.

Longer tank life.

SEE YOUR DEALER OR WRITE

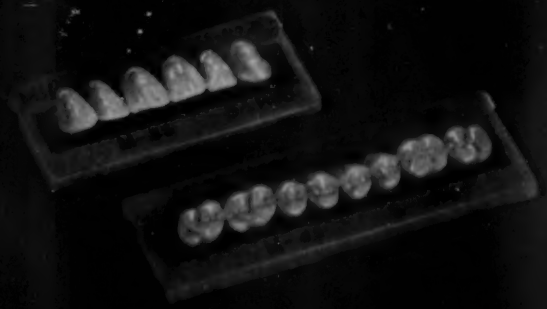
The Rapid Fixer, also new improved formula, lasts longer, fixing and hardening films more uniformly.

$1.25 PER CAN TO MAKE ONE GAL.

RINN X-RAY PRODUCTS Inc.
2929 N. Crawford • Chicago 41, Ill.

MAKE YOUR PATIENTS HAPPIER WITH

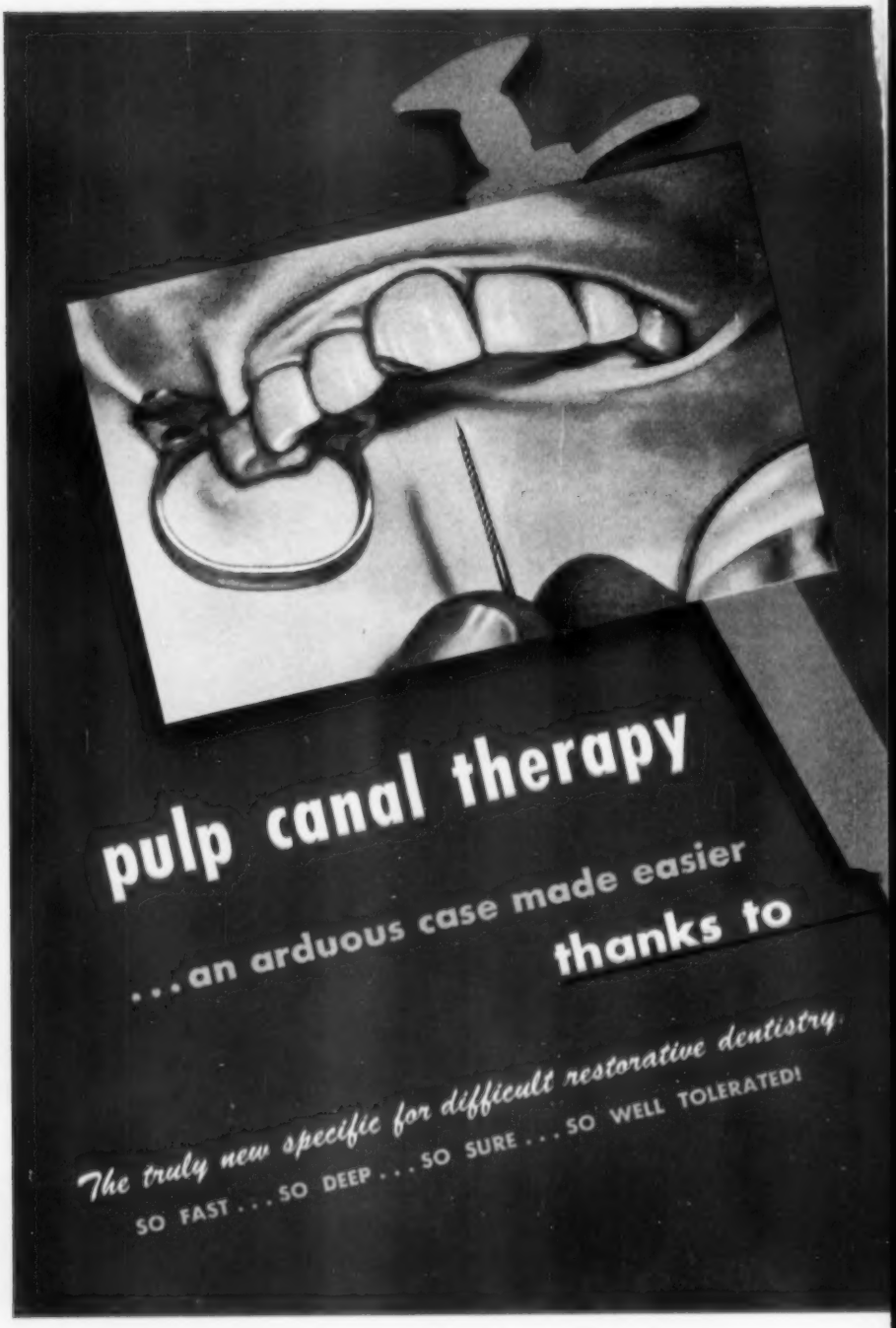
PORCELAIN TEETH WITH NO PIN LINE

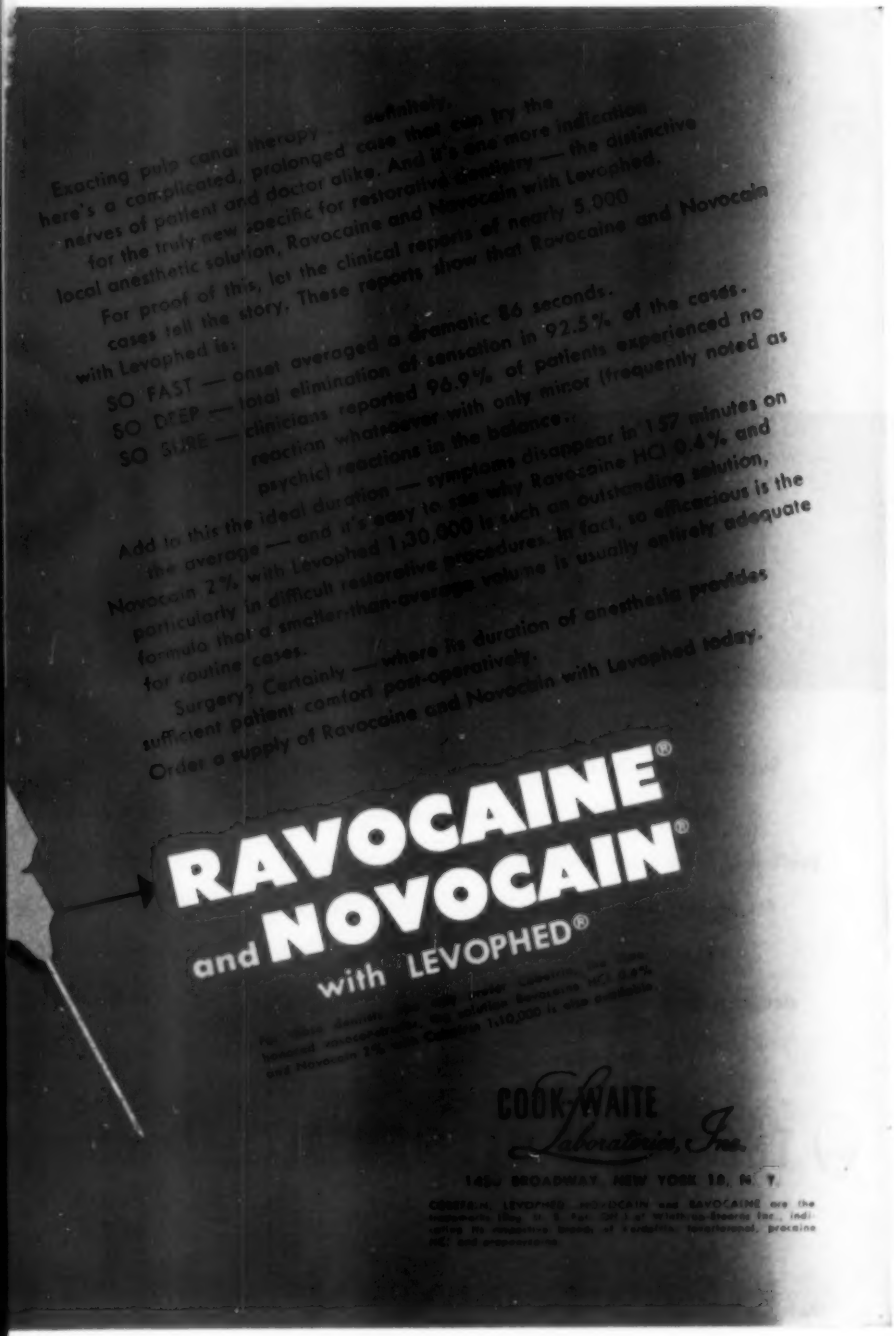


AUSTENAL MICROMOLD TEETH

Obtain or Prescribe Dentistry's Most Lifelike Teeth At VITALLIUM® Laboratories.

® by AUSTENAL LABORATORIES, INC.


pulp canal therapy
...an arduous case made easier
thanks to
The truly new specific for difficult restorative dentistry.
SO FAST . . . SO DEEP . . . SO SURE . . . SO WELL TOLERATED!


Exacting pulp canal therapy — definitely,
here's a complicated, prolonged case that can try the
nerves of patient and doctor alike. And it's one more indication
for the truly new specific for restorative dentistry — the distinctive
local anesthetic solution, Ravocaine and Novocain with Levophed.
For proof of this, let the clinical reports of nearly 5,000
cases tell the story. These reports show that Ravocaine and Novocain
with Levophed is:
SO FAST — onset averaged a dramatic 86 seconds.
SO DEEP — total elimination of sensation in 92.5% of the cases.
SO SURE — clinicians reported 96.9% of patients experienced no
reaction whatsoever with only minor (frequently noted as
psychic) reactions in the balance.
Add to this the ideal duration — symptoms disappear in 137 minutes on
the average — and it's easy to see why Ravocaine HCl 0.4% and
Novocain 2% with Levophed 1:30,000 is such an outstanding solution,
particularly in difficult restorative procedures. In fact, so efficacious is the
formula that a smaller-than-average volume is usually entirely adequate
for routine cases.
Surgery? Certainly — where its duration of anesthesia provides
sufficient patient comfort post-operatively.
Order a supply of Ravocaine and Novocain with Levophed today.
RAVOCAINE®
and NOVOCAIN®
with LEVOPHED®
COOK-WAITE
Laboratories, Inc.
160 BROADWAY, NEW YORK 18, N. Y.

put them in

S. S. WHITE equipment can complement your skill . . . inspire confidence . . . build prestige

Successful practice rests literally in your skilled hands . . . capable hands that merit the finest equipment to express their skill fully and profitably. That's the purpose of S. S. White equipment . . . engineered for smooth operating, designed for time-saving, and styled to convey the instant impression of cleanliness, comfort and competence. Your dealer will gladly demonstrate the S. S. White Master Unit D-2 on request.

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your plans for profitable practice

COMFORT

EFFICIENCY

EASE

S. S. White
Master Unit D-2
Motor Chair
and
Operating
Stool

Depth

WITHOUT

Danger

■ More than half a million people visit magnificent Grand Canyon annually . . . to view what has been described as "ten million years of creation seen in 1/10 second's glance!" Many thousands make the exciting trip into the canyon . . . a full mile straight down to the seething Colorado River . . . along a precipituous, but safe trail blasted into sheer cliffs of multi-colored rock —
Depth Without Danger.

Monocaine 2ME

THE *Safety First* LOCAL ANESTHETIC

■ Safe, potent MONOCAINE 2ME transports your patients into the blessed realm of freedom from pain and is indicated for cases that are difficult to anesthetize with other solutions. It produces anesthesia as profound as 4% procaine but is less toxic. Its action is gentle; free from untoward reactions.

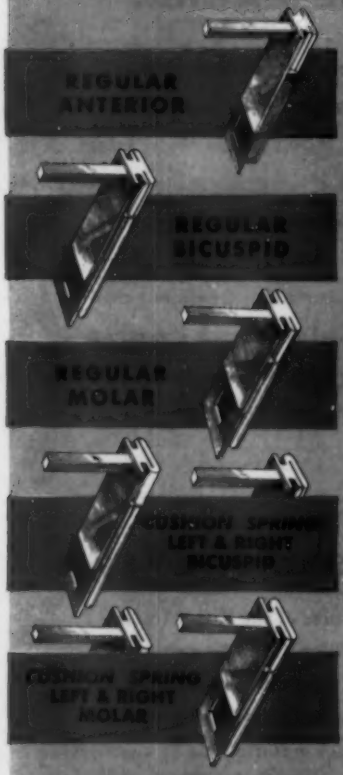
Use MONOCAINE 2ME, the local anesthetic that always provides
Depth Without Danger.

NOVOCOL CHEMICAL MFG. CO., INC.
BROOKLYN 7, N. Y.

NO BRIDGE IS STRONGER THAN THE METAL IN ITS ABUTMENTS

BAKER REGULAR AND CUSHION SPRING

PRECISION ATTACHMENTS



Baker Precision Attachments in 3 sizes for Anterior Bicuspid and Molar are made of Orthoclasp #2 Wire Alloy. Fuses at 2732°F. Brinell of 245.

All Baker Precision Attachments can be used in any location in the mouth. However, the left and right Cushion Spring Type are recommended when using clasp or lingual arm rests because they are so easy to adjust to the exact, delicate amount of permanent spring tension required, with an ordinary penknife blade.

The extraordinary resiliency of the hard, wear-resistant Orthoclasp #2 Wire Alloy eliminates the need of continued adjustments. They do not oxidize and can be soldered or cast against with definite assurance that the very hard, high fusing box will not warp.

All mandrels, posts and boxes are interchangeable. Be sure when ordering to state if mandrels are required.

Baker Split Pin Denture Attachments are supplied in 14 and 16 gauge, mandrels included. Their mouth efficiency and value in eliminating unsightly clasps from inexpensive partial dentures has been proven over many years of successful mouth service.

For cases you will be proud to see in years to come, we recommend Baker Chicago 4 for gold-colored cases and Baker 14% Casting Gold for platinum-colored cases.

If your dealer does not handle Baker Golds, order direct giving us your dealer's name.

BAKER & CO., INC.

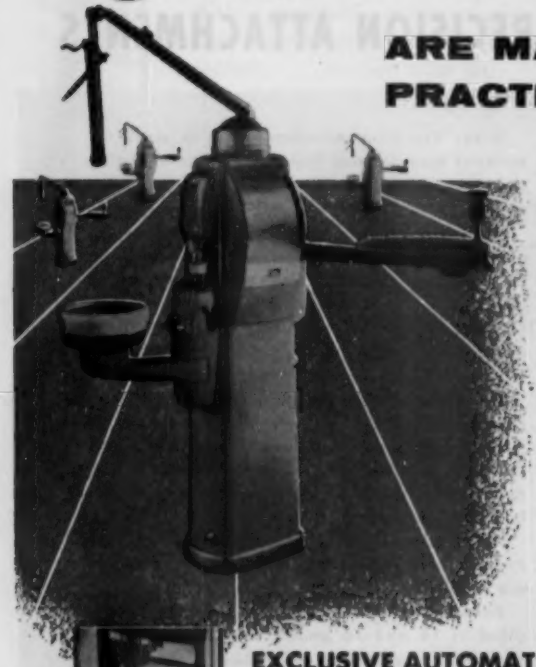
850 PASSAIC AVENUE, EAST NEWARK, NEW JERSEY

BAKER

THE WORLD'S LARGEST WORKERS AND REFINERS OF PRECIOUS METALS

THOUSANDS OF *All-New* *Ritter* Instru-Matic *Units*

ARE MAKING DENTAL PRACTICE EASIER



Dentists from coast to coast have enthusiastically accepted the all-new Ritter Instru-Matic Unit. One of the greatest modern day advances in dental equipment, this Ritter Instru-Matic Unit makes patient treatment easier. Dental skills reach maximum effectiveness with the help of the all-new Ritter Instru-Matic Unit.

EXCLUSIVE AUTOMATIC SOLENOID CUP FILLER

One of the many outstanding features of the Ritter Instru-Matic Unit is the automatic cup filler. Cup fills automatically, shutting off when two-thirds full. Cup refills to same level after patient uses it . . . saving time and eliminating detail to make the dentist's day easier. Water is controlled by a positive acting solenoid valve. For more features of the all-new Ritter Instru-Matic Unit, ask your Ritter dealer, or write The Ritter Company Inc., Ritter Park, Rochester 3, New York.

Ritter

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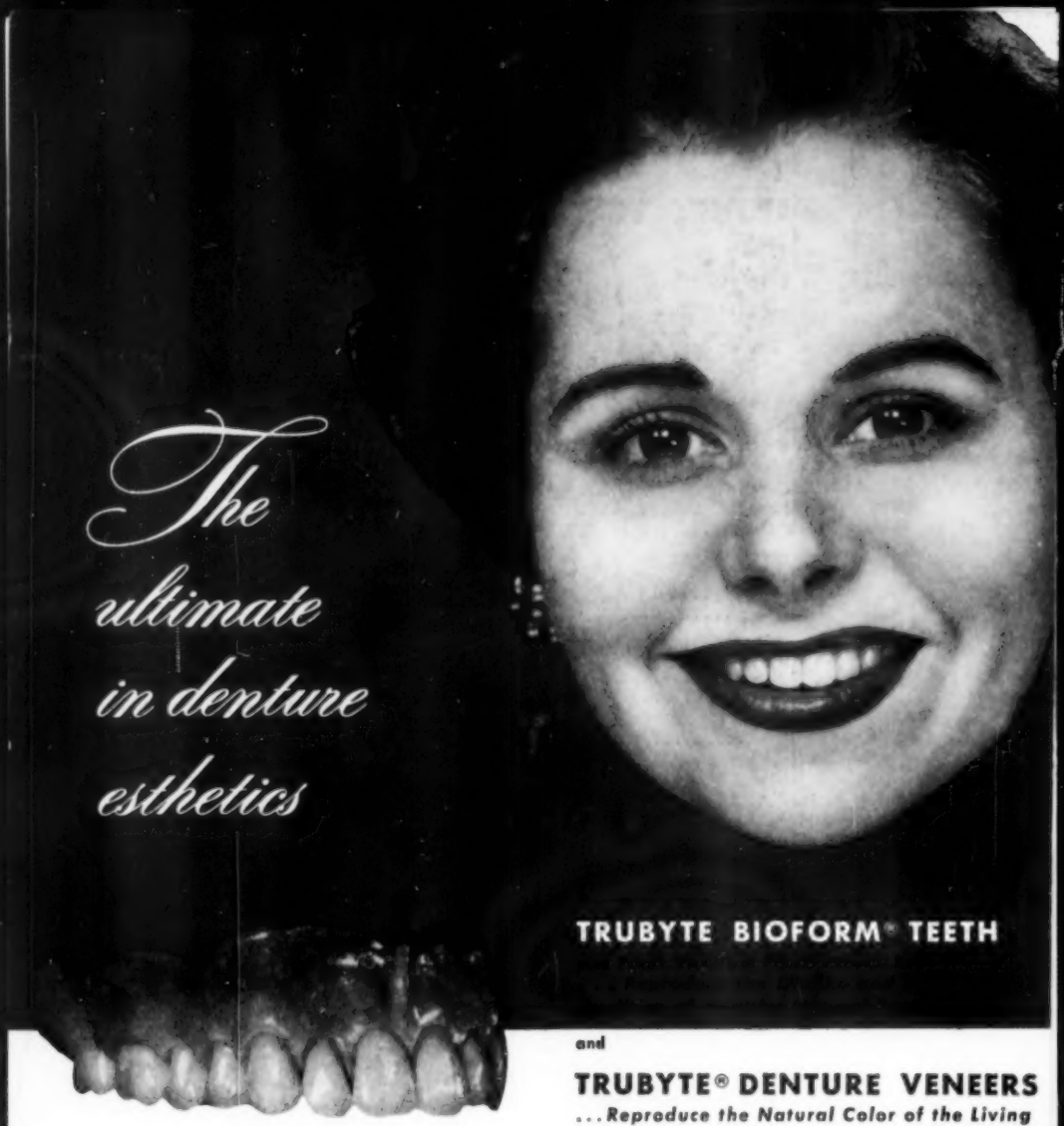

TRUBYTE BIOFORM® TEETH

and

TRUBYTE® DENTURE VENEERS

...Reproduce the Natural Color of the Living Tissue and the Anatomy of Natural Gum Contours

Now, for the first time, you can offer *all your denture patients* a completely new concept of denture service—the modern esthetic denture with faithful reproduction of anatomy and amazingly lifelike simulation of natural tissue color. Trubyte Denture Veneers, in combination with the beautiful natural forms and shades of Trubyte Bioform Teeth, open the way to a vast new esthetic denture service.

Never before has it been possible to produce so lifelike, so beautiful, so natural looking dentures—and by such simple and easy to use methods. Ask your Trubyte Dealer or Dental Laboratory to show you the new Trubyte Bioform Veneer Denture. Make *your own* comparison test and you'll be convinced.

The Dentists' Supply Company of N. Y. *York, Pennsylvania*